Proceedings of the
American Association of Textile Chemists and Colorists

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Editor of Proceedings: Carl Z Draves, 30 Lahey St, New Hyde Park, N Y

OCTOBER 12, 1953

Fall Meeting Report—— Southeastern Section

September 5, 1953
Ralston Hotel, Columbus, Ga

THE Fall meeting of the Southeastern Section, highlighted by the installation of new officers, was held at the Ralston Hotel, Columbus, Ga on September 5, 1953.

Featured at the afternoon meeting were papers on "The New Bond Dyeing Machine" by Boyce C Bond, Pittsburgh Coke and Chemical Company, and "The Development of Tufted Fabrics in the Textile Industry" by James L Fisperman, Jr, of Cabincraft, Inc.

A color film, "The Great New South", was shown at the dinner session, courtesy of Delta Airlines. S Jack Davis, retiring chairman, thanked his cohorts for their assistance during the past year and introduced the following new officers:

Chairman——T Howard McCamy, Pepperell Mfg Co

Vice Chairman——William B Griffin, Dexter Chemical Corp

Secretary——John C Cook, W R C Smith Publishing Co

Treasurer——James W Swiney, Fulton Bag & Cotton Mills

Sectional Committee——David Merriweather, Seydel-Woolley & Co; W O Bozeman, Russell Mfg Co; R W Freeze, American Aniline Products, Inc; Robert B Hallowell, Clark Thread Co

Corporate membership chairman——William B Amos, Stein Hall & Co, Inc

Publicity chairman——J K Boykin, National Aniline Div

Respectfully submitted,
JOHN C COOK, *Secretary*

ITT Technical Director to Address N Y Section

JACK COMPTON, technical director of the Institute of Textile Technology, Charlottesville, Va, will discuss "New Textile Fibers with the Structural Elements of Natural Cellulosic Fibers" at the October 23rd meeting of the New York Section at Kohler's Swiss Chalet, Rochelle Park, N J.

CALENDAR

AATCC

COUNCIL
1953—Nov 20 (Hotel Commodore, New York)
1954—Jan 27, Apr 30, June 15, Sept 15, Nov 19.
1955—Jan 21, Apr 15, June 17

NATIONAL CONVENTIONS
Sept 15-18, 1954 (Atlanta Biltmore, Atlanta, Ga); Sept 21-23, 1955 (Chalfonte-Haddon Hall, Atlantic City, N J.

NEW YORK SECTION
Oct 23, Nov 20 (Swiss Chalet); Jan 29, Feb 26 (Hotel Statler, N Y); April 23, 1954, May 21, 1954 (Swiss Chalet).

MID-WEST SECTION
November 7, February 13 (Hotel Bismarck, Chicago, Ill.)

NORTHERN NEW ENGLAND SECTION
Nov 6 (LTI); Dec 4 (MIT Faculty House).

PACIFIC SOUTHWEST SECTION
Nov 20, Jan 29.

PIEDMONT SECTION
Jan 30 (Hotel Poinsette, Greenville, S C); Apr 10 (Hotel Roanoke, Roanoke, Va); June 11-12 (Outing, Mayview Manor, Blowing Rock, N C); Sept 11 (Hotel Barringer, Charlotte, N C).

PHILADELPHIA SECTION
Oct 23 (Penn-Sheraton Hotel, Philadelphia, Pa); Dec 4; Jan 15, 1954.

RHODE ISLAND SECTION
Oct 23 (Prov Eng Soc); Dec 4 (Annual Meeting, Sheraton-Biltmore, Providence).

SOUTH CENTRAL SECTION
Dec 5 (Patten Hotel).

WESTERN NEW ENGLAND SECTION
Nov 6 and Dec 11 (Rapp's Restaurant, Shelton, Conn).

OTHER EVENTS

AMERICAN ASSOCIATION OF TEXTILE TECHNOLOGY, INC
Nov 4, Dec 2 (Builder's Club, New York, N Y).

AMERICAN CHEMICAL SOCIETY
National Chemical Exposition—Oct 12-15, 1954, Chicago, Ill.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS
Textile Industry Conference—Oct 29-30, N C State College, Raleigh, N C.

AMERICAN OIL CHEMISTS' SOCIETY
27th Fall Meeting, November 2-4, Sherman Hotel, Chicago, Ill.

AMERICAN SOCIETY FOR QUALITY CONTROL
Meeting of the Carolinas Section—Feb 4-6, N C State College School of Textiles, Raleigh, N C.
Conference of the Carolinas, Georgia, Tennessee, Birmingham and Huntsville Sections—Nov 5-7, Chattanooga, Tenn.

AMERICAN SOCIETY FOR TESTING MATERIALS
1953 Fall Meeting, Oct 14-16, New York, N Y.

AMERICAN TEXTILE MACHINERY ASSOCIATION
Exhibit of American Textile Machinery, April 26-May 1, Atlantic City Exhibition Hall, Atlantic City, N J.

ASSOCIATION OF CONSULTING CHEMISTS AND CHEMICAL ENGINEERS, INC
Annual Meeting—25th Anniversary-October 27 (Hotel Belmont Plaza, New York).

DRYSALTERS CLUB OF NEW ENGLAND
Oct 30, Jan 18, April 30 (Hotel Vendome, Boston); June 25 (Annual Outing, Andover Country Club).

EXPOSITION OF CHEMICAL INDUSTRIES
Nov 30-Dec 5, Commercial Museum and Convention Hall, Philadelphia, Pa.

THE FIBER SOCIETY
Spring Meeting—May 5-6, Monticello Hotel and Thomas Jefferson Inn, Charlottesville, Va.

GARMENT DYERS GUILD OF AMERICA
Technical and business meeting—Dec 5, Netherlands Plaza, Cincinnati, O.

NATIONAL COTTON COUNCIL OF AMERICA
Annual Meeting—Feb 1-2, Atlanta, Ga.
Cotton Research Clinic—Feb 25-27, The Carolina, Pinehurst, N C.

NATIONAL SAFETY CONGRESS AND EXPOSITION
Oct 19-23, Conrad Hilton, Morrison and Hamilton Hotels, Chicago, Ill.

NEW YORK BOARD OF TRADE (DCAT)
28th Annual Dinner, March 4 (Waldorf-Astoria, New York, N Y).

PHI PSI FRATERNITY
51st Annual Convention, Feb 25-27 (The Carolina, Pinehurst, N C).

SOCIETY OF CHEMICAL INDUSTRY
Plastics and Polymers Group Meeting—March 24-26, Institution of Electrical Engineers, Savoy Place, London, England.

SOCIETY OF INDUSTRIAL PACKAGING AND MATERIALS HANDLING ENGINEERS
October 19-24, Mechanics Hall, Boston, Mass.

SOCIETY OF THE PLASTICS INDUSTRY
Meeting of the Sheeting and Coated Fabrics Division—Dec 3-4, Commodore Hotel, New York, N Y.

SOUTHERN TEXTILE EXPOSITION
October 4-9, 1954 (Textile Hall, Greenville, S C).

TEXTILE RESEARCH INSTITUTE
1953 Annual Meeting, Nov 12-13, Commodore Hotel, New York.

TEXTILE TECHNICAL FEDERATION OF CANADA
Exhibit—April, 1955, Show Mart, Montreal.

*AATCC Research Newsletter No. 5

NEWS IN GENERAL

Dr Harold W Stiegler has announced that the 177th meeting of the Technical Committee on Research (the former General Research Committee) will be held at the Hotel Commodore in New York at 1:30 p m, Friday, November 20. Meetings of the research committees will be scheduled the day before. Room accommodations will be assigned when the chairmen have reported their plans to Dr. Stiegler.

Charles W Dorn, Chairman of TCR, has advised that this may be the last time these meetings will be held over a two-day period. In future, meetings of TCR and research committees will be held to the one-day schedule previously announced, providing it proves practical. The plan is being tried in answer to criticism to the effect that the previous schedule had been costly in time and expense.

Corporate Membership Committee Chairman George L Baxter has advised that the new bulletin "AATCC Research in Action," recently distributed to Corporate Members, is now being readied for a mailing to nonmember corporations. Mr Baxter has pointed out that income from Corporate Membership dues for the 1952-53 period fell nearly $5,000 short of the requirements of AATCC research. He is hoping to obtain enough new members in the current drive to put the research program on a completely self-sufficient basis. "AATCC Research in Action" will be published in the next issue of the AMERICAN DYESTUFF REPORTER for the information of individual members.

COMMITTEE ACTIVITIES

As a result of a special meeting called by the Executive Committee on Research this month in New York, the Abrasion, Washfastness, and Dry-cleaning Committees are joining with others in an interlaboratory testing program to evaluate the various proposed uses of the Accelerotor.

Dr Stiegler put on a special demonstration of this new AATCC-developed testing device and displayed the results of nearly four years of research covering dry-, moist- and wet abrasion of all types of fabrics.

An outstanding point of interest was that end-use wear life may be predicted by alternate dry-wear and laundering tests in the same instrument with only a few minutes running time. The device was shown to be capable of predicting the blistering of fused shirt collars; edge-wear of cuffs, collars and seams; drycleaning abrasion; durability of finishes; dye penetration; and many other factors—all within a few minutes running time, even where correlations run as high as 200 commercial launderings. Good reproducibility was also demonstrated.

The new rapid control test for gas fading has undergone extensive inter-laboratory checks by Chairman T G Hawley and several members of his committee. The test may be submitted as a tentative standard at the TCR meeting on November 20, according to Dr Hawley. This new procedure was demonstrated at AATCC's research exhibit at the 1953 Convention.

TCR Chairman Charles W Dorn has advised that he is about ready to organize a research committee on odors in finished textiles and would like to hear from anyone who is interested in serving. Odor identification and evaluation are admittedly difficult subjects to approach from the standpoint of standard-test-methods development, but there is widespread feeling that something should be done. Those wishing to take part in this challenging project should contact Mr Dorn.

The Committee on Colorfastness to Light held a special meeting in the offices of Atlas Electric Devices Company in Chicago during the 1953 Convention. John W Lane and Joseph E Norton described the Company's efforts to perfect the Fade-Ometer in co-operation with the Lightfastness Committee. It was explained that the project will insure more efficient use of existing equipment, while providing the basis for refinements in the manufacture of new machines.

Also during the Convention, textile laboratory directors of Chicago mail-order firms met with several AATCC principals. The meeting included a review of current work on water repellency and a summary of other AATCC projects of interest to the group.

* Published every other issue of the AMERICAN DYESTUFF REPORTER.

'53 Convention Attracts 1223 Registrants

RHODE ISLAND SECTION WINS INTERSECTIONAL CONTEST FOR SIXTH TIME

TWELVE HUNDRED AND TWENTY-THREE registrants accepted the invitation of their Mid-West Section hosts to gather at Chicago's Conrad Hilton Hotel August 17-19 for the 1953 Convention of the American Association of Textile Chemists and Colorists. Included among them was a Canadian delegation numbering better than fifty. All activities took place in the spacious Hilton, including the Annual Exhibition, which featured the displays of approximately fifty concerns. The displays, for the first time, were open to the general public.

The Rhode Island Section, winner of five previous AATCC Intersectional Contests since the inception of competition in 1940, took top honors for the second straight year with a paper entitled "An Investigatin of the Effect of Resin Finishes on the Lightfastness of Direct Dyes". Second place went to the New York Section for the paper "Union Dyeing Wool with Fibers Colored by Dispersed Dyes", and third place, to the Philadelphia Section for the entry "Leveling Unevenly Dyed Material". Seven sections competed in the contest.

Other Convention highlights included the initial National Student Contest, held in conjunction with the Alumni Luncheon; the traditional Olney Medal Award; the Annual Banquet; and the various technical sessions, which featured sixteen papers.

President J Robert Bonrar (left) presents the 1953 Olney Medal to Roland E Derby

Student Contest Committee Chairman Arthur T Brainerd (center) poses with contestants Lonnie T Howard (left) and James M Polito

The Olney Medal

Events of Thursday

Formal activities commenced on Thursday morning with the 188th meeting of the Council. The resignation of William R Moorhouse, National Aniline Division, as treasurer was accepted, and in appreciation of his 31 years of service, he was elected treasurer-emeritus. Albert E Sampson, also of National Aniline, succeeds Mr Moorhouse in the national office.

Vice president Arthur T Brainerd, Ciba Co, Inc, served as chairman of the Alumni Luncheon and National Student Contest, held at noon Thursday in the Grand Ballroom. President J Robert Bonnar, General Dyestuff Corporation, took the occasion to extend an official welcome to the Convention. Others at the head table included Frank J O'Neil, Intersectional Contest Chairman; a judging committee for the National Student Contest, consisting of Chairman Percival Theel, Philadelphia Textile Institute, Jack Schandler, Rohm & Haas Co, and Harley Y Jennings, Dan River Mills; representatives of textile colleges having AATCC student chapters; and the participants in the National Student Contest.

Of the papers presented at the Contest, the first, by Lonnie T Howard of Clemson College, was awarded first prize. It was entitled "Dyeing Union Shades on Blends of Dacron-Orlon with Wool". James M Polito, Fairleigh Dickinson College, presented the second-prize winner, "Fastness Properties of Acetate Dyes Aftertreated with Curable Resins".

The initial technical session, "Science Fibers", took place on Thursday afternoon in the Grand Ballroom with Technical Program Chairman Elliott Morrill, The Best Foods, Inc, presiding. This session featured four papers.

The Ladies Program opened with a cocktail party from 4 to 6 pm.

Olney Medal

SEPTEMBER

Events of Friday

Following a breakfast meeting of the Executive Committee on Research, Friday morning technical sessions on "Hosiery" and "Wool" were held respectively in the South and West Ballrooms. A G Alexander, Arkansas Co, Inc, presided over the former, and Herman Boxser, Acadia Synthetic Products Division, over the latter. Both sessions featured four papers.

The 10th impression of the Olney Medal, the Association's annual award for outstanding contributions to textile chemistry, was presented to Roland E Derby, founder of The Derby Co, Inc, and Textile Aniline & Chemical Co, at the Olney Medal Luncheon on Friday noon. Approximately 200 attended the affair, with Convention Vice Chairman Joseph H Jones, Phoenix Dye Works, presiding. Albert E Sampson, newly elected treasurer, lauded Mr Derby in his address, "The Medalist ——The Man", and Harold W Leitch, Pacific Mills, told the audience of the medalist's professional exploits in "The Medalist ——The Scientist". Presentation of the Award was made by President Bonnar. Mr Derby responded with the "Address of the Medalist", in which he advocated pilot-plant research for reducing ideas presented to the wet-processing trades to practical form.

Technical sessions (excepting the Intersectional Contest) were concluded on Friday afternoon with concurrent meetings. H T Latham, E I du Pont de Nemours & Co, Inc, presided at the "Cotton" session in the South Ballroom, while N A Ruston, Emery Industries, Inc, handled the "Textile Auxiliaries" session. Both featured four papers each.

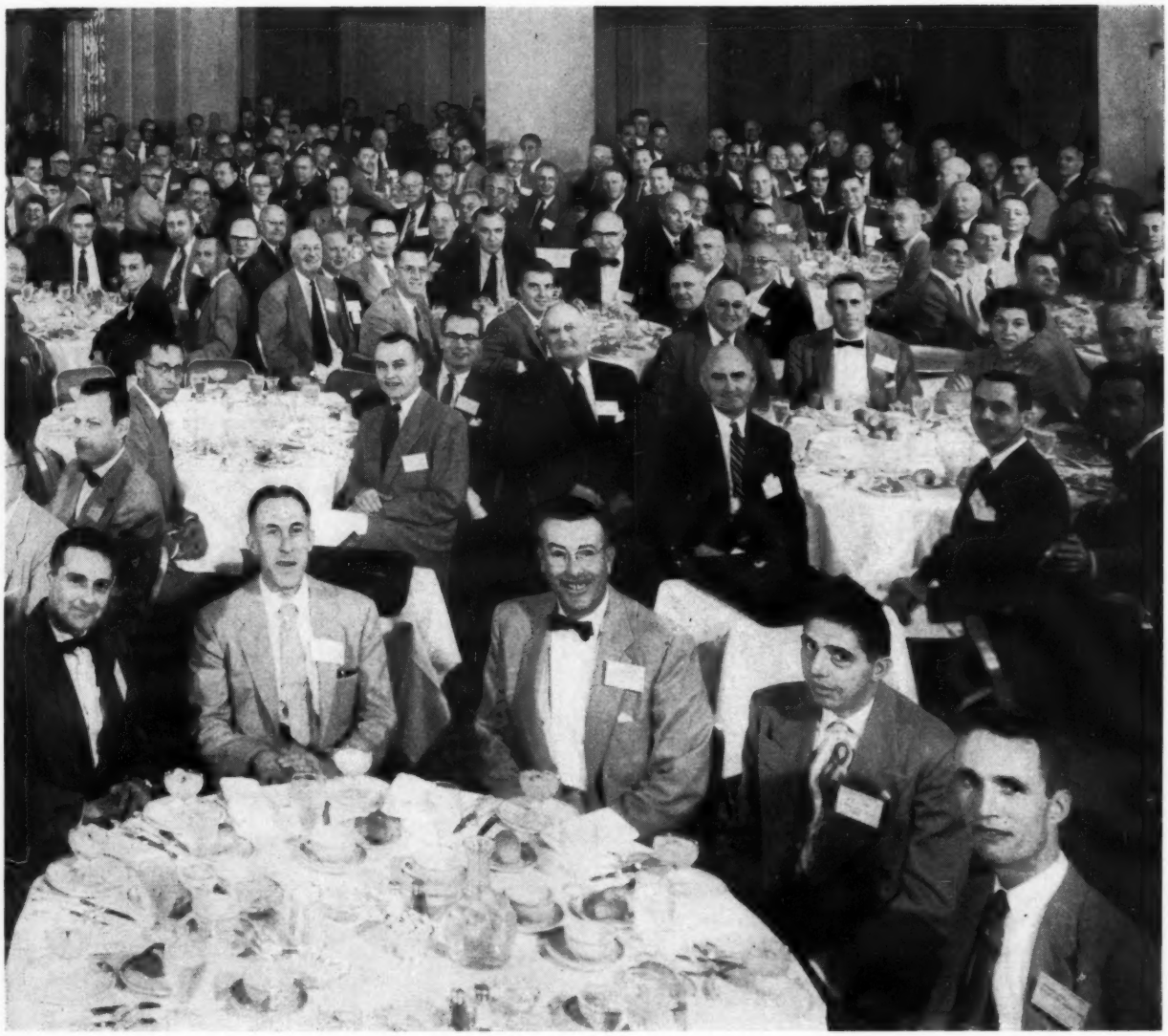
Ladies' activities on Friday included visits to Don MacNeil's Breakfast Club, a home furnishings tour through Chicago's renown Merchandise Mart, and a luncheon and fashion show at Citro's.

Events of Saturday

A breakfast meeting of the National Convention Committee preceded the

Luncheon

18, 1953



3-hour Intersectional Contest on Saturday morning, setting the stage for the Annual Banquet that evening.

Over 500 members and guests attended the Banquet, the traditional concluding feature, with Convention Chairman Eric W Camp, National Aniline Division, presiding.

Vice president Samuel L Hayes, Ciba Co, Inc, once again assumed an accustomed role as toastmaster. In opening, he presented Mid-West Chairman Alfred J Olson, Phoenix Hosiery Co, who extended greetings to the gathering. Mr Olson concluded his remarks by presenting a wristwatch to Mr Camp in appreciation of his efforts.

Mr Hayes introduced those at the head table (see photo and caption on page P693) before presenting President Bonnar. Mr Bonnar, in delivering the "President's address", discussed the "State of the Association", and paid special tribute to this year's Convention Committee. A telegram of greeting from the (British) Society of Dyers and Colourists was read.

Following Mr Bonnar's address, Percival Theel, representing the Publications Committee, presented the 3rd Annual American Dyestuff Reporter Award to Robert H Blaker, of E I du Pont de Nemours & Co, Inc, for his paper "The Principle of Copper Dyeing on Polyacrylic Fibers", which appeared in the *Proceedings* on February 2, 1953. (For details of the award, see page P649 of the September 28th issue, American Dyestuff Reporter.)

The awarding of prizes for the Intersectional Contest and the National Student Contest were made by Frank J O'Neil, Pacific Mills.

W George Parks, University of Rhode Island, again accepted the Intersectional Contest Award for the Rhode Island Section. He wore a green shirt of varying shades, made from samples used in the tests conducted during the preparation of the prize-winning paper.

Albert C Van Dusen, vice president of

Alumni Luncheon and National Student Contest

(SEPTEMBER 17, 1953)

Northwestern University, was introduced as "a relief hurler" for Hugh M Comer, Avondale Mills, who was slated to be guest speaker and was unable to be present because of a bereavement in his family. Dr Van Dusen's subject was "You Can be Human and Successful Too".

So ended the 1953 Convention, the general consensus being that it had illustrated well its theme "American Achievement Today Challenges Comparison".

AATCC on TV

Chicago television viewers were introduced to AATCC via the "Hi Ladies" program of WGN-TV at 12 noon on Friday, September 18th.

Jack Payne, master of ceremonies, interviewed Elliott Morrill, AATCC Technical Program Chairman, and George H Johnson, general manager, American Institute of Laundering, for about five minutes. Fabrics from the Convention exhibits were displayed and blends of the new fibers were discussed. The background of the Association was also outlined.

Early Arrivals for Convention Visit AIL at Joliet

APPROXIMATELY 150 early arrivals for the 1953 Convention took advantage of an invitation from the American Institute of Laundering to tour the Institute and participate in a panel discussion on September 16th at Joliet, Illinois.

Those in attendance were able to view the complete research and laboratory facilities of the Institute, their fully-equipped commercial laundry, and the School of Laundry management, where nearly 900 have been trained for management positions in the laundry industry.

Following the tour and luncheon, Albert Johnson, AIL general manager, introduced the following panel to the audience: George H Johnson, AIL vice-president, presiding; Ralph Yonke, AIL Laundry Department; Malcolm Woodward, manager of the AIL Certified Washable Seal Laboratory; Lee Johnston, in charge of production engineering; and George Isaacson, in charge of the Service Department.

Questions from those on the tour steered the panel discussion onto a variety of subjects, including the following: the particular methods and materials used by the AIL laundry in packing and covering presses; commercial laundry methods of sorting and washing fabrics made of new synthetic fibers; special washing and bleaching questions on nylon; methods of preventing damage to chlorine-bleached fabrics with chlorine-retentive resins, etc.

Intersectional Contest

National Committee

(L to r): Jackson A Woodruff; Earle D McLeod, secretary; Frank J O'Neil, chairman; Leonard J Armstrong; Kenneth A Howry. Not in attendance when photo was taken: Thomas R Smith and John M Gould.

Speakers

(L to r): Virgil T Hartquist, Philadelphia; Edmund A Leonard, New York; Kenneth R Fox, Northern New England; Robert D Blum, Jr, South Central; M G Morris, Mid-West. Not represented in photo: Rhode Island, Piedmont.

Judges

Seated (l to r): J William Timperley, Rhode Island; Edward S Chapin, Northern New England; William D Appel, chief justice; William H Horne, Western New England. Standing: Daniel Frishman, Washington; Arthur I Hultberg, Mid-West; D Bruce Thornton, South Central; Herman P Baumann, New York; Edward A Murray, Piedmont. Malcolm J Reider, Philadelphia, was not present when photo was taken.

Technical Sessions

(Pictured on this and the following two pages are speakers and presiding officials at the five technical sessions held during the 1953 Convention).

"Science Fibers"

Presiding——Elliott Morrill, The Best Foods, Inc

"The Dynel 'Inner Structure' "——C A Setterstrom, Carbide and Carbon Chemicals Corp

"Acetate Blends of Improved Performance"——B S Sprague, Celanese Corp of America

"Recent Advances in Dyeing 'Orlon' Acrylic Fiber and 'Dacron' Polyester Fiber and Blends of These with Other Fibers"——J F Laucius, E I du Pont de Nemours & Co, Inc

"Laundering Properties of the Science Fibers"——George H Johnson, American Institute of Laundering

"Hosiery"

Presiding——A G Alexander, Arkansas Co, Inc

"Color Development and Its Relationship to Fashion"——Helen Sisson, Phoenix Hosiery Co

"A New Method of Vat Dyeing Knitted Goods"——Robert D Blum, Jr, May Hosiery Mills

"Woolen and Worsted Spun Yarn in Hosiery"——Elwood W Munz, Richard C O'Brien, Yarns

"How the System of Yarn Manufacturing, as well as the Fiber's Physical Properties, Affect the Characteristics of Yarn"——John B Caron, Caron Spinning Co

"Wool"

Presiding——Herman Boxser, Acadia Synthetic Products Division

"Practical Aspects of Grease Wool Scouring"——R E Wolfrom, Rohm and Haas Co

"The Nature of the Modifications of Wool by Various 'Chlorination' Processes and Their Effect on the Wear-Life of Shrink-Resistant Materials"——Daniel Frishman, Harris Research Laboratories

"Application of Calcofast Dyes to Wool"——Henry E Millson, Calco Chemical Div

"The Dyeing Characteristics of Different Wool Grades"—W F Brommelsiek, Forstmann Woolen Co

"Cotton"

Presiding——H T Latham, E I du Pont de Nemours & Co, Inc

"Cotton —— An Old Fiber with a New Future"——Leonard Smith, National Cotton Council of America

"Better Mercerizing for Improved Luster"——Arnold M Sookne, Harris Research Laboratories

"The Behavior of Optical Bleaching Agents on Cellulosic Materials"——S N Glarum, Ciba Company, Inc

"Practical Partial Acetylation of Cotton"——E N Buras, Jr, Southern Regional Research Laboratory, USDA

"Textile Auxiliaries"

Presiding——N A Ruston, Emery Industries, Inc

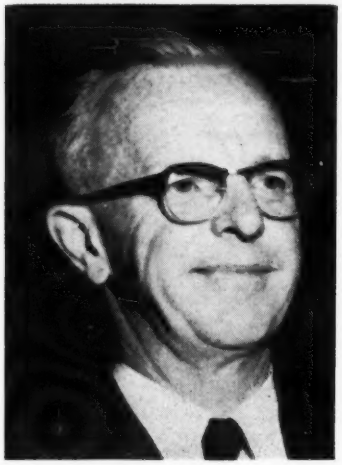
"Adsorption of Detergents in the Dyeing Process"——L F Hoyt, National Aniline Div

"Polyvinyl Pyrrolidone —— A Versatile Compound with Textile Use Potential"——E C Hansen, General Dyestuff Co.p

"Resin Dispersions for the Textile Industry" —— Leonard Shapiro, American Polymer Corp

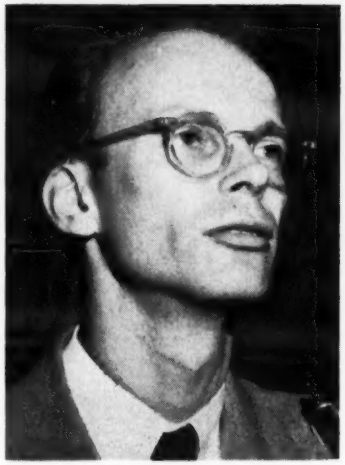
"Antistatic Finishes for Textiles"——Mason Hayek, E I du Pont de Nemours & Co, Inc

"SCIENCE FIBERS"

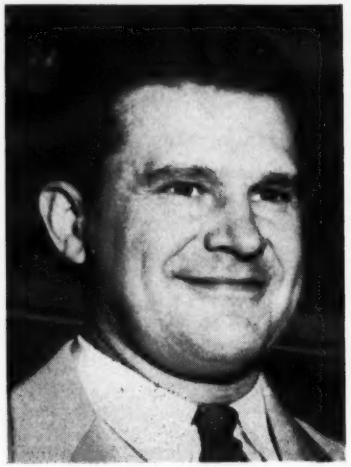


E Morrill

C A Setterstrom



B S Sprague



J F Laucius

G H Johnson

"HOSIERY"

E Morrill | C A Setterstrom | B S Sprague | J F Laucius | G H Johnson

"HOSIERY"

A G Alexander

H Sisson

R D Blum, Jr

E W Munz

J B Caron

"WOOL"

H Boxser

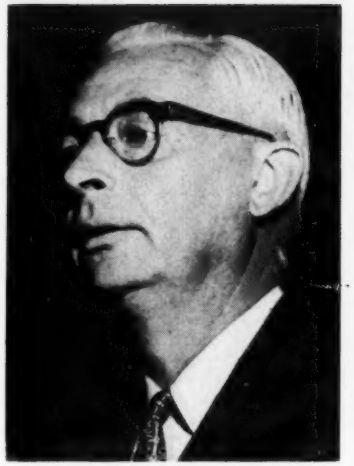
R E Wolfrom

D Frishman

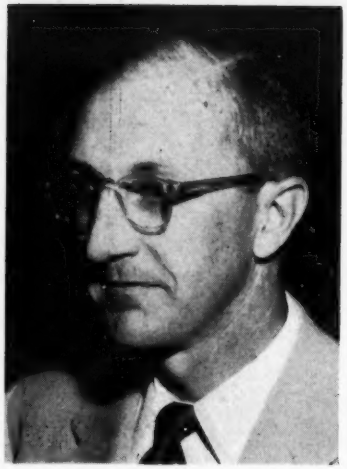
H E Millson

W F Brommelsiek

"COTTON"



H T Latham



L Smith

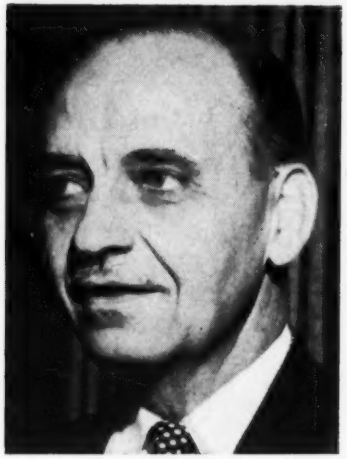
A M Sookne

S N Glarum

PHOTO NOT AVAILABLE

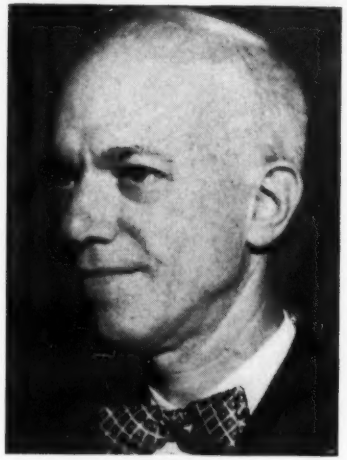
E N Buras, Jr

"TEXTILE AUXILIARIES"

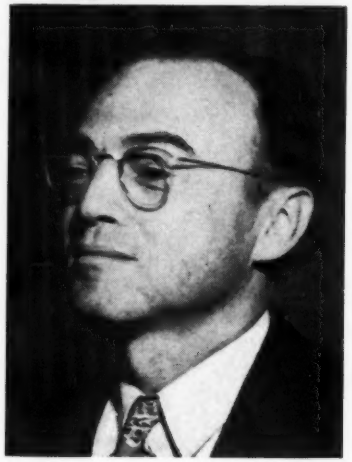


N A Ruston

L F Hoyt



E C Hansen



L Shapiro

M Hayek

Annual Banquet Speakers

E W Camp
Presiding

S L Hayes
Toastmaster

A J Olson
Greetings

J R Bonnar
President's Address

P Theel
American Dyestuff Reporter Award

F J O'Neil
Award of Intersectional Contest Prizes

All technical, Intersectional Contest and Student Contest papers, as well as official transcripts of the Olney Medal Award Luncheon and Annual Banquet will be published in future issues of the American Dyestuff Reporter.

A C Van Dusen
"You Can be Successful and Human Too"

Annual Banquet — September 19, 1953

Head Table, Annual Banquet

Front row: (seated, l to r): George O Linberg, vice president (New England Region); Samuel L Hayes, vice president (Southern Region); Roland E Derby, 1953 Olney Medalist; J Robert Bonnar, president; Harold C Chapin, secretary; Albert E Sampson, treasurer; Arthur T Brainerd, vice president (Western Region); Alfred J Olson, chairman, Mid-West Section.

Second Row: Harold W Stiegler, director of research; Leonard S Little, chairman, Executive Committee on Research; Percival Theel, chairman, Publications Committee; Henry F Herrmann, past president; Albert C Van Dusen, guest speaker; Carl Z Draves, past president; Frank J O'Neil, chairman, Intersectional Contest Committee; Eric W Camp, Convention Chairman; Frank J Knight, Chairman, Quebec Section, Canadian Association of Textile Colourists and Chemists.

Third Row: P J Wood, past president; C Russell Gill, chairman of the 1954 Convention; George L Baxter, chairman, Corporate Membership Committee; Charles W Dorn, chairman, Technical Committee on Research; William D Appel, past president; Joseph H Jones, Convention Vice Chairman; Elliott Morrill, chairman, Technical Program; Cecil Urquhart, President, Canadian Association of Textile Colourists and Chemists; C Norris Rabold, past president.

Robert L Blaker, recipient of the 1953 American Dyestuff Reporter Award was not present when photo was taken.

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS
SCHEDULE OF MISCELLANEOUS INCOME
FOR THE YEAR ENDING JULY 31, 1953

Research:		
Launder-Ometer royalties	$ 315.00	
Grey scales	22.50	
Light-fading cabinets and stands	300.00	$ 637.50
Sales of technical supplies, royalties, etc.:		
Yearbooks	$2,102.94	
Dye standards	531.70	
Knitted tubing	605.46	
Dyestuff Reporters and reprints	447.10	
Crock-meter cloth	419.00	
Crock meters	2,410.91	
Moth cloth	228.50	
Multi-fibre cloth royalties	806.45	
Flammability tester royalties	3.00	
Water-test apparatus	545.80	
Gas fading units	139.80	
Color transference charts	590.55	
Analytical methods	725.84	
Buttons	75.75	
Application of Vat Dyes Monograph	3,103.66	
Cotton skeins commissions	78.70	
Standard grease wool	96.75	
Apparatus catalogs and dry cleaning kits	1.00	
Accelerotor royalties	125.00	13,037.91
General:		
Proceeds from sale of office equipment		12.00
Total miscellaneous income		$13,687.41

AUDITOR'S REPORT

TO the Members of the
American Association of Textile Chemists and Colorists:

We have made an examination of the accompanying statement and supporting schedule summarizing the receipts and disbursements of the treasurer and secretary of the American Association of Textile Chemists and Colorists for the year ending July 31, 1953. In connection therewith, we examined or tested the cashbooks and other records supporting the receipts and disbursements by methods and to the extent we deemed appropriate, but we did not communicate with the members to confirm the amount of recorded receipts from dues and subscriptions or from advance subscriptions for the *Colour Index*.

In our opinion, the accompanying statement and supporting schedule fairly summarize the recorded receipts and disbursements of the Association for the year ending July 31, 1953 and the balances of cash in banks, advance expense funds, and securities owned as of that date.

PRICE WATERHOUSE & CO.

Boston 10, Mass
August 18, 1953

TREASURER'S REPORT

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS
STATEMENT SUMMARIZING RECEIPTS AND DISBURSEMENTS FOR THE YEAR ENDING JULY 31, 1953

		Allocation of Funds										
				Colour Index-Second Edition (See Footnote)								
	Total	General Research	Philadelphia Section Research Project	Advance Subscriptions	Disbursements	American Dyestuff Reporter Prize Award Fund	American Viscose Co Scholarship Fund	Olney Library Fund	Olney Medal Fund	Convention Fund	Technical Supplies	General
Receipts:												
Membership dues:												
Corporate memberships	$ 47,985.00	$ 45,660.00										$ 2,325.00
Sustaining memberships	642.50	642.50										...
Senior, Junior, Associate and Student Memberships	49,398.50	...										49,398.50
Total membership dues	$ 98,026.00	$ 46,302.50										$ 51,723.50
American Dyestuff Reporter—Prize Award Fund	1,093.00	...				$1,093.00						...
Annual meeting registrations—net amount received from Northern New England Section	10,123.51	...				...				$9,624.32		499.19
Dividends and interest received (net)	7,124.34	2,077.54				155.35			$ 400.90	...		4,490.55
Advance subscriptions to Colour Index	11,452.00	...		$11,452.00		...			...	...		...
Miscellaneous income, per accompanying schedule	13,687.41	637.50		...		...			...	...	$13,037.91	12.00
Total receipts	$141,506.26	$ 49,017.54		$11,452.00		$1,248.35			$ 400.90	$9,624.32	$13,037.91	$56,725.24
Disbursements:												
Research salaries and expenses	$ 51,763.35	$ 51,763.35										
Expenses chargeable to Colour Index Project (see footnote)	210.47	...			$ 210.47							
Howes Publishing Company—Subscriptions to American Dyestuff Reporter	20,096.25	...			...						$ 2,385.00	$17,711.25
Disbursements for account of Olney Medal Fund	136.57	...			...				$ 136.57		...	...
Disbursements for account of Olney Library Fund	63.67	...			...			$63.67	...		...	...
Disbursements for account of American Viscose Company Scholarship	876.19	...			...		$ 876.19	...	...		...	...
Secretary's expenses, clerical assistance, etc	25,455.93	...			...		...	...	...		7,039.69	18,416.24
American Dyestuff Reporter Prize Award	200.00	...			...	$ 200.00	...	...	...		...	...
Publicity	782.75	698.37			...	...	...	...	...		...	84.38
Purchases of technical supplies for resale	11,381.03	...			...	...	...	...	...		11,381.03	...
Accountants' fee	450.00	...			...	...	...	...	...		...	450.00
Section membership allowances	4,901.83	...			...	...	...	...	...	$1,862.43	...	3,039.40
Trade association dues	170.00	...			...	...	...	...	...	...	...	170.00
Bonds for treasurer, assistant treasurer, and secretary	80.00	...			...	...	...	...	...	...	...	80.00
Other general expenses	357.60	...			...	...	...	...	...	...	...	357.60
Total disbursements	$116,925.64	$ 52,461.72			$ 210.47	$ 200.00	$ 876.19	$63.67	$ 136.57	$1,862.43	$20,805.72	$ 40,308.87
Excess (deficiency) of receipts over disbursements	$ 24,580.62	($ 3,444.18)		$11,452.00	($ 210.47)	$1,048.35	($ 876.19)	($63.67)	$ 264.33	$7,761.89	($ 7,767.81)	$ 16,416.37
Cash in banks, advance expense fund and investments (at cost), July 31, 1952	255,669.94	128,793.55	$2,000.00	...	(41,451.06)	5,107.00	1,424.77	63.67	6,324.18	...	20,434.15	132,973.68
Cash in banks, advance expense funds and investments (at cost), July 31, 1953	$280,250.56	$125,349.37	$2,000.00	$11,452.00	($41,661.53)	$6,155.35	$ 548.58	$..	$6,588.51	$7,761.89	$12,666.34	$149,390.05

Summary of cash in banks, advance expense funds and investments at July 31, 1953:	
Cash in banks	$ 91,866.44
Advance expense funds	2,500.00
United States Savings Bonds, Series F (value at maturity, $30,000; redemption value at July 31, 1953, $28,710) at cost	22,200.00
United States Savings Bonds, Series G (face value $22,000; redemption value at July 31, 1953, $21,122) at cost	22,000,00
$10,000 United States Treasury Bonds 2½% 1967-72 at cost (value based on market quotations July 31, 1953, $9,262)	10,017.68
$50,000 United States Treasury Bonds 2% 1953, at cost (value based on market quotations July 31, 1953, $50,030)	50,444.13
$30,000 Federal Land Bank Bond (Consolidated Federal Farm Loan) 2¼% 1955-53, at cost (value based on market quotations July 31, 1953, $29,700)	30,046.88
Other marketable securities, at cost (value based on market quotations July 31, 1953, $63,827)	51,175.43
	$280,250.56

Note: The Association has entered into an agreement with The Society of Dyers and Colourists of Bradford, England, jointly to compile and publish a work entitled "Colour Index (Second Edition)." Under the memorandum of agreement dated January 18, 1952 the work of preparation is to be shared equally and all costs incurred in the compilation, printing, distributing, etc are to be borne equally by the parties thereto. Future net losses or revenues arising from the production and sale of this work are likewise to be borne or shared equally by the parties. The total cost of production is presently estimated to be £90,000 of which £45,000, equivalent at the current rate of exchange to approximately $126,000, represents the Association's present total commitment. As at July 31, 1953, the Association on its part had expended in salaries and other costs a total amount of $41.661.53. The Association and the British Society, each in their respective territories, have announced plans for receiving subscriptions in advance of publication to assist in financing the project and to obtain an indication of the immediate demand for the work. Since June 22, 1953 the Association had received $11,452.00 in advance subscriptions. Information is not currently available as to the aggregate amount of expenditures made and advance subscriptions received by the British Society. The joint agreement requires annual equalization settlements between the parties with respect to costs paid and revenues received by each. The first such settlement is to be made as of December 31, 1953.

Respectfully submitted:

ALBERT E SAMPSON
Asst Treasurer
American Association of Textile Chemists and Colorists

Report of Committee on Glossary

ACID—Any substance which in solution yields hydrogen ions. Also applied to the portion of a molecule which contains hydrogen capable of being ionized by a base.

ACID, ACETIC—CH_3COOH. Glacial acetic is 99.5% pure. Commercial acetic is usually 28% pure.

ACID, BORIC—H_3BO_3. Also known as orthoboric acid or hydrogen orthoborate. Usually expressed as B_2O_3 or sodium borate.

ACID, CARBONIC—H_2CO_3. A mineral acid found in natural waters and carbonated beverages. Causes water hardness and is responsible for color of natural waters. Usually 1 to 10 ppm in natural waters.

ACID, CHROMIC—H_2CrO_4. Usually expressed as CrO_3. Commercial chromic acid is usually 99% pure.

ACID, HYDROCHLORIC—HCl. Commercial hydrochloric acid is usually 37% pure.

ACID, HYDROFLUORIC—HF. Commercial hydrofluoric acid is usually 52% pure.

ACID, NITRIC—HNO_3. Commercial nitric acid is usually 42° Baumé.

ACID, OXALIC—$H_2C_2O_4 \cdot 2H_2O$. Commercial oxalic acid is usually 99% pure.

ACID, PHOSPHORIC—H_3PO_4. Commercial phosphoric acid is usually 85% pure.

ACID, SULFAMIC—HSO_3NH_2. Commercial sulfamic acid is usually 99% pure.

ACID, SULFURIC—H_2SO_4. Commercial sulfuric acid is usually 66° Baumé.

ACRE-FOOT—The volume of water required to cover 1 acre to a depth of 1 foot. Used in sewage treatment and water softening.

ACTIVATED SLUDGE—Sludge from the aeration of sewage by a trickling filter.

ACTIVATED SLUDGE PROCESS—Sewage treatment in which sewage is aerated in the presence of activated sludge from the process.

ACTIVATED SLUDGE UNIT—Aeration tank and final settling tank.

* Members of the Committee on Glossary of Terms Relating to Sewage and Sewage Treatment of the Sanitary Engineering Division of the American Society of Civil Engineers, Federation of Sewage Works Associations, and American Public Works Association.

Report of Rhode Island Sectional Stream-Pollution Committee——

Glossary On Waste Treatment And Stream Pollution*

COMMITTEE

Peter J Kolupaev
R H Phillips
P J Ariente
N J Letang
David R Meikle
George Wood
Harold J Northrup
William Stafford, *Chairman*

This glossary has been submitted by Thomas H Hart, Secretary of the National Committee on Stream Pollution, AATCC, of which Prof Percival Theel is Chairman, after authorization for publication by the National Committee.

W Stafford, Chairman

A

ACID. A substance that produces a pH below 7.0 in water solution because of the presence of hydrogen (H^+) or hydronium (H_3O^+) ions. The strength of an acid is proportional to the concentration of these ions. An acid contains hydrogen that is replaceable by metals and neutralizes hydroxides to form salts.

ACIDITY. A term used to represent the hydrogen (H^+) or hydronium (H_3O^+) ion concentration of a water or waste, expressed in equivalent parts per million of calcium carbonate.

ACIDITY, METHYL ORANGE. A measure of the mineral acid acidity of a water. Measured by the quantity of carbonate-free sodium hydroxide required to bring the water to a pH value of 4.3, as indicated by the change in color of methyl orange. It is expressed in equivalent parts per million of calcium carbonate.

MINERAL ACID. See **ACIDITY, METHYL ORANGE.**

PHENOLPHTHALEIN. A measure of the total acidity of a water. Measured by the quantity of carbonate-free sodium hydroxide required to bring the water to a pH value of 8.2, as indicated by a change in color of phenolphthalein. It is expressed in equivalent parts per million of calcium carbonate.

TOTAL. See **ACIDITY, PHENOLPHTHALEIN.**

ACRE-FOOT. (1) A term used in measuring the volume of water, equal to the quantity of water required to cover 1 acre 1 ft in depth, or 43,560 cu ft; (2) A term used in sewage treatment in measuring the volume of material in a trickling filter. One acre-foot contains 43,560 cu ft.

ACTION, BIOCHEMICAL. Chemical changes resulting from the metabolism of living organisms.

ACTIVATION. The generation, under aerobic conditions, of zoogleal organisms capable of adsorbing organic material from the sewage in the activated sludge process.

AERATION. The bringing about of intimate contact between air and a liquid by one of the following methods: spraying the liquid in the air, bubbling air through the liquid, or by agitation of the liquid to promote surface absorption of air.

AERATOR. A device that promotes aeration.

AEROCHLORINATION. The application of compressed air and chlorine gas to sewage or wastes for the removal of grease.

AEROFILTER. A commercial term applied to a trickling filter containing a relatively coarse filtering material and operating at a high rate, which may be maintained, if necessary, by recirculation of the filter effluent or other diluting liquids.

AFTERGROWTH, BACTERIOLOGICAL. Growth of bacteria in a water pipe, reservoir or stream after treatment.

AGGLOMERATION. The coalescence of dispersed suspended matter into larger flocs or particles which settle rapidly.

ALGAE. Primitive plants, one or many-celled, usually aquatic and capable of elaborating their foodstuffs by photosynthesis. They assist in the reoxygenation of the water of lakes and rivers that contain sewage and/or industrial wastes.

ALGICIDE. Any substance which kills algae.

ALKALI. Hydroxides and certain soluble salts, principally of sodium, potassium, magnesium and calcium, characterized by producing a pH above 7 in water solution.

ALKALINE. Containing a sufficient amount of alkali substances to raise the pH value of water or soils above 7.0, or to be harmful to the growth of crops. See **ALKALI.**

ALKALINITY. A term used to represent the content of carbonates, bicarbonates, hydroxides, and occasionally borates, silicates, and phosphates in water. It is expressed in equivalent parts per million of calcium carbonate.

* Most of the definitions are adapted from "Glossary: Water and Sewage Control Engineering" prepared under the joint sponsorship of American Public Health Association, American Society of Civil Engineers, American Water Works Association and Federation of Sewage Works Associations.

ALKALINITY, BICARBONATE. The alkalinity equivalent of bicarbonate ions, expressed in parts per million of calcium carbonate.

CARBONATE. The alkalinity equivalent of carbonate ions, expressed in parts per million of calcium carbonate.

CAUSTIC. The alkalinity equivalent of hydroxyl ions, expressed in parts per million of calcium carbonate.

HYDROXIDE. See **ALKALINITY, CAUSTIC.**

METHYL ORANGE. A measure of the total alkalinity of a water. Measured by the quantity of sulfuric acid required to bring the water to a pH value of 4.3, as indicated by the change in color of methyl orange. It is expressed in equivalent parts per million of calcium carbonate.

PHENOLPHTHALEIN. A measure of the hydroxides plus one half the normal carbonates in a water. Measured by the amount of sulfuric acid required to bring the water to a pH value of 8.2, as indicated by a change in color of phenolphthalein. It is expressed in equivalent parts per million of calcium carbonate.

ALUM. A common name for aluminum sulfate hydrate, $Al_2(SO_4)_3 \cdot 18H_2O$. [Formerly it was potassium aluminum sulfate hydrate, $K_2SO_4 \cdot AL_2(SO_4)_3 \cdot 24H_2O$.]

ALUM, BLACK. Water works alum containing a small percentage of activated carbon.

AMMONIATOR. Apparatus used for applying ammonia or ammonium compounds to water.

AMMONIFICATION. Bacterial decomposition of organic nitrogen to ammonia.

AMOEBA. See **PROTOZOA.**

ANALYSIS, BACTERIAL. The examination of water and sewage to determine the presence, number, and identification of bacteria; more commonly called bacterial examination.

CHEMICAL. Analysis by chemical methods to show the composition and concentration of substances.

MICROSCOPIC. The examination of water to determine the presence and amounts of plant and animal life, such as algae, diatoms, protozoa, crustacea, etc, as an indicator of the source of the water, pollution by sewage, progress of stream purification, and forms of organic life which might cause objectionable tastes, odors, or appearances, or interfere with filtration. More commonly termed microscopic examination.

ANALYSIS, SEWAGE. The determination of chemical composition, concentration, and biological condition of sewage and treatment-plant effluents.

ANTIBIOSIS. Biological action which inhibits putrefaction and oxidation.

ANTICHLORS. Reagents such as sulfur dioxide and sodium bisulfite which can convert excess chlorine into an inert salt.

APPARATUS, DOSING. Apparatus for regulating the application of sewage or water to filters or for applying the required quantity of chemicals to sewage or water.

AREA, DRAINAGE. The area of a drainage basin or watershed, expressed in acres, square miles, or other unit of area.

B

BACKWASHING. The operation of cleaning a rapid or mechanical filter by reversed flow of water.

BACTERIA. Primitive plants, generally free of pigment, which reproduce by dividing in one, two, or three planes. They occur as single cells, groups, chains, or filaments, and do not require light for their life processes. They may be grown by special culturing out of their native habitat.

BACTERIA, AEROBIC. Bacteria which require free (elementary) oxygen for their growth.

ANAEROBIC. Bacteria which grow in the absence of free oxygen and derive oxygen from breaking down complex substances.

COLIFORM GROUP. A group of bacteria, predominantly inhabitants of the intestine of man but found also on vegetation, including all aerobic and facultative anaerobic gram-negative, nonspore-forming bacilli that ferment lactose with gas formation.

FACULTATIVE ANAEROBIC. Bacteria which can adapt themselves to growth in the presence, as well as in the absence, of oxygen.

PATHOGENIC. Bacteria which can cause disease.

SAPROPHYTIC. Bacteria which thrive upon dead organic matter.

BALANCE, OXYGEN. The relation between the biochemical oxygen demand of a sewage, or treatment plant effluent, and the oxygen available in the diluting water.

BANKS, SLUDGE. Accumulations on the bed of a waterway of deposits of solids of sewage or industrial waste origin.

BASIN. A natural or artificially created space or structure, surface or underground, which is capable, by reason of its shape and the character of its confining material, of holding water. The term is sometimes used for a receptacle midway in magnitude between a reservoir and a tank.

COAGULATION. A basin employed for the coagulation of suspended or colloidal matter, with or without addition of a coagulant, in which the liquor is mixed gently to induce coagulation, flocculation, and agglomeration, in preparation for subsequent sedimentation.

MIXING. A basin or tank wherein agitation is applied to water, sewage, or sludge to induce dispersion of applied chemicals.

SETTLING. A structure designed to hold water or sewage in a quiescent state or at reduced velocity for a sufficient interval of time to permit the gravitational deposit of suspended matter, with or without the aid of previous flocculation or coagulation.

BED, SLUDGE. An area comprising natural or artificial layers of porous material upon which digested sewage sludge is dried by drainage and evaporation. A sludge bed may be open to the atmosphere or covered, usually with a greenhouse-type superstructure. Also called **SLUDGE DRYING BED.**

BIOCHEMICAL. Resulting from biologic growth or activity, and measured by or expressed in terms of the ensuing chemical change.

BIOCHEMICAL OXYGEN DEMAND (BOD). See **DEMAND, BIOCHEMICAL OXYGEN.**

BOARD, SCUM. A vertical baffle dipping below the surface of sewage in a tank, to prevent the passage of floating matter. Also called **SCUM BAFFLE.**

BOTTOM, FILTER. (1) The underdrainage system for collecting the water that has passed through a rapid sand filter and for distributing the wash water that cleans the filtering medium; (2) The underdrainage system supporting the graded gravel of a biological bed. It may consist

of especially fabricated tile or concrete blocks containing water ways and slots in the top for conveying the underdrainage, or it may consist of inverted half tile.

BREAKER, SCUM. A device installed in a sludge digestion tank to break up scum.

C

CAKE, SLUDGE. The material resulting from air drying or dewatering sludge (usually forkable or spadable).

CAPACITY, DISCHARGE. The maximum rate of flow that a conduit, channel, or other hydraulic structure is capable of passing.

CARBONATOR. A device for the recarbonation of water.

CASCADE. (1) A stretch of a stream, somewhat between a rapids and a waterfall, where the drop in elevation of the stream bed is considerable, but not sufficient to cause the water to fall vertically; (2) A sudden drop installed in a waterway to produce agitation and aeration of the liquid flowing over.

CATCHER, GRIT. A chamber usually placed at the upper end of a depressed sewer, or at other points on combined or storm sewers where wear from grit is possible. The chamber is of such shape and dimensions as will reduce the velocity of flow through it and thus permit the separation of mineral from organic solids by differential sedimentation. Also called **SAND CATCHER.**

CHAMBER, CHLORINATION. A detention basin wherein chlorine is diffused through liquid.

DETRITUS. A detention chamber larger than a grit chamber, usually with provision for removing the sediment without interrupting the flow of liquid. A settling tank of short detention period designed, primarily, to remove heavy settleable solids.

GRIT. See **CATCHER, GRIT.**

MIXING. A chamber used for facilitating the mixing of chemicals with a liquid. It may be equipped with a mechanical device for accomplishing the mixing. See **TANK, MIXING.**

CHANNEL, MIXING. A channel provided in a water or sewage treatment plant, wherein the hydraulic characteristics of the waterway, or its construction features, are such that a mixing of chemicals and liquid is accomplished.

CHEMICAL OXYGEN DEMAND (C O D). See **DEMAND, CHEMICAL OXYGEN.**

CHLORAMINES. Compounds of organic amines or inorganic ammonia with **CHLORINE.**

CHLORINATED LIME. A combination of slaked lime and chlorine gas (also termed **BLEACHING POWDER, CHLORIDE OF LIME, HYPOCHLORITE OF LIME, ETC**) in which calcium oxychloride is the essential ingredient. When dissolved in water the calcium oxychloride decomposes to provide calcium hypochlorite and calcium chloride.

CHLORINATION. The application of chlorine to water, sewage, or industrial wastes, generally for the purpose of disinfection, but frequently for accomplishing other biological or chemical results.

CHLORINATION, POST. The application of chlorine to water, sewage, or industrial wastes subsequent to any treatment, including prechlorination. The term refers only to a point of application.

PRE. The application of chlorine to water, sewage, or industrial wastes prior to any subsequent treatment. This term refers only to a point of application.

CHLORINE-AMMONIA PROCESS. The application of chlorine and ammonia to water, or of ammonia to water containing chlorine, to provide combined residual chlorination.

CHLORINE DEMAND. The difference between the amount of chlorine added to water, sewage, or industrial wastes and the amount of residual chlorine remaining at the end of a specified contact period. The demand for any given water varies with the amount of chlorine applied, time of contact, and temperature.

CHLORINE TEST, IODOMETRIC. The determination of residual chlorine in water, sewage, or industrial wastes by adding potassium iodide and titrating the liberated iodine with a standard solution of sodium thiosulfate with starch solution as a colorimetric indicator.

ORTHO-TOLIDINE. The determination of residual chlorine in water, sewage, or industrial wastes, using ortho-tolidine reagent and colorimetric standards.

ORTHO-TOLIDINE-ARSENITE. The determination of residual chlorine, of its composition (combined available chlorine, free available chlorine), and of interfering substances in water, by the use of ortho-tolidine reagent, sodium arsenite reagent, and colorimetric standards.

CLARIFICATION. See **SEDIMENTATION.**

CLARIFIER. See **TANK, SEDIMENTATION.**

COAGULANT. A material, which when added to sewage or water, will combine with certain substances ordinarily present to form a precipitate comprising floc particles more or less gelatinous in character, having the capacity to remove colloids from sewage or water.

COAGULATION. The agglomeration of colloidal or finely divided suspended matter by the addition to the liquid of an appropriate chemical coagulant, by biological processes, or by other means.

COLLECTOR, GRIT. A device placed in a grit chamber to convey deposited grit to one end of the chamber for removal.

SCUM. A mechanical device for skimming and removing scum from the surface of settling tanks.

SLUDGE. A mechanical device for scraping the sludge on the bottom of a settling tank to a sump, from which it can be drawn by hydrostatic or mechanical action.

COMMINUTION. The process of screening sewage and cutting the screenings into particles sufficiently fine to pass through the screen openings.

COMPACT. An agreement or contract between two or more parties. The term is usually applied to agreements or contracts between states or other political subdivisions.

COMPACT, INTERSTATE. A compact between states; some compacts cover the development and utilization of interstate streams, abatement of pollution, and other purposes.

CONCENTRATION, HYDROGEN-ION. The weight of hydrogen ions in grams per liter of solution. Commonly expressed as the pH value that represents the logarithm of the reciprocal of the hydrogen-ion concentration.

CONDUIT. An open or closed duct, usually of masonry, for conveying relatively large volumes of liquid.

CONE, IMHOFF. A conically shaped graduated glass vessel used to measure approximately the volume of settleable solids in various liquids of sewage origin. Also called **IMHOFF GLASS.**

CONSTANT, DEOXYGENATION. A constant that expresses the rate of the biochemical oxidation of organic matter under aerobic conditions. Its value depends on the time unit involved (usually the day) and varies with temperature.

CONTAMINATION. A general term signifying the introduction into water of micro-organisms, chemicals, wastes, or sewage, which renders the water unfit for its intended use.

CONTROLLER, RATE-OF-FLOW. An automatic device inserted in the effluent pipe of each filter in a rapid sand filtration plant for varying the pressure head in the effluent pipe, thus maintaining a constant head loss throughout the filtering run. See **REGULATOR.**

COPPERAS. A common name for ferrous sulfate hydrate, $FeSO_4 \cdot 7H_2O$.

COPPERAS, CHLORINATED. A solution of ferrous sulfate and ferric chloride produced by chlorinating a solution of ferrous sulfate.

COUNT, BACTERIOLOGICAL. See **NUMBER, MOST PROBABLE (M P N); NUMBER, INDICATED (I N); COUNT, PLATE.**

PLATE. Number of colonies of bacteria grown on selected solid media at a given temperature and incubation period, usually expressed in number of bacteria per milliliter of sample.

CRENOTHRIX. A genus of bacteria characterized by unbranched attached filaments having a gelatinous sheath in which iron is deposited. They precipitate metallic deposits in pipes, etc, which sometimes color the water. They also, after their death, cause disagreeable taste and odor in the water.

CREST. The top of a dam, dike, spillway, or weir, to which water must rise before passing over the structure.

CUBIC FOOT PER SECOND (C F S). A unit of discharge for measurement of flowing liquid, equal to a flow of 1 cu ft per sec past a given section. Also called **SECOND-FOOT.**

CULVERT. A conduit for the free passage of surface drainage water under a highway, railroad, canal or other embankment.

CUPRICHLORAMINE. A chemical mixture of copper sulfate, ammonia, and chlorine in stoichiometric proportions, used as an algicide.

CURRENT, CONVECTION. In settling basins, ascending and descending (vertical) movements of water caused by differences of temperature and the force of gravity when the density of an upper stratum becomes greater than that of the underlying stratum.

LITTORAL. A current that moves along the shore in a direction parallel to the shore line.

CURVE, OXYGEN SAG. A curve that represents the profile of dissolved oxygen content along the course of a stream, resulting from de-oxygenation associated with biochemical oxidation of organic matter, and reoxygenation through the absorption of atmospheric oxygen and through biological photosynthesis.

CURVE, RAINFALL-INTENSITY. A curve which expresses the relation of rates of rainfall and their duration. Each curve is generally for a period of years during which time the intensities shown will not, on the average, be exceeded more than once.

D

DAM. A barrier constructed across a watercourse for the purpose of (1) creating a reservoir, (2) diverting water therefrom into a conduit or channel, (3) creating a head which can be used to generate power, and (4) improving river navigability. Dams are classed as fixed and movable.

DATA, BASIC HYDROLOGICAL. Records of measurements and observations of the quantity per unit of time of: precipitation, including snowfall; stream flow; evaporation from water; the elevation of natural water planes, both surface and underground and the change thereof from time to time; and of such related phenomena and natural conditions as are necessary to allow estimates of past, present, and probable future occurrence of water to be made.

DECOMPOSITION OF SEWAGE. The breakdown of the organic matter in sewage first through aerobic activity and then by anaerobic oxidation and nitrification.

DEFERRIZATION. In water treatment the removal of soluble compounds of iron from water.

DEFICIENCY, OXYGEN. The additional quantity of oxygen required to satisfy the **BIOCHEMICAL OXYGEN DEMAND** in a given liquid. Usually expressed in parts per million.

DEMAND, BIOCHEMICAL OXYGEN (B O D). The quantity of oxygen utilized in the biochemical oxidation of organic matter in a specified time and at a specified temperature. It is not related to the oxygen requirements in chemical combustion, being determined entirely by the availability of the material as a biological food and by the amount of oxygen utilized by the microorganisms during oxidation.

BIOCHEMICAL OXYGEN, FIRST STAGE. That part of oxygen demand associated with biochemical oxidation of carbonaceous, as distinct from nitrogenous, material. Generally the greater part, if not all, of the carbonaceous material is oxidized before the second state, or active oxidation of the nitrogenous material, takes place.

BIOCHEMICAL OXYGEN, IMMEDIATE. (1) The initial quantity of oxygen utilized by polluted liquid immediately upon being introduced into water containing dissolved oxygen. It may be exercised by end products of prior biochemical action or by chemical substances avid for oxygen; (2) In the standard laboratory procedure, the apparent B O D for 15 min at 20°C.

BIOCHEMICAL OXYGEN, STANDARD. Biochemical oxygen demand as determined under standard laboratory procedure for 5 days at 20°C, usually expressed in parts per million.

BIOCHEMICAL OXYGEN, ULTIMATE. The total quantity of oxygen required completely to satisfy **FIRST STAGE BIOCHEMICAL OXYGEN DEMAND.**

CHEMICAL OXYGEN. The quantity of oxygen utilized in the chemical oxidation of organic matter under specified conditions by means of acidic or alkaline potassium permanganate, potassium dichromate or ceric sulfate. See **DICHROMATE OXYGEN DEMAND; OXYGEN CONSUMED FROM PERMANGANATE.**

CHLORINE. See **CHLORINE DEMAND.**

DICHROMATE OXYGEN. See **DICHROMATE OXYGEN DEMAND.**

DENITRIFICATION. The reduction of nitrates in solution by biochemical action.

DEOXYGENATION. The depletion of the dissolved oxygen in a liquid. Under natural conditions associated with the biochemical oxidation of organic matter present.

DETRITUS. The sand, grit, and other coarse material removed by differential sedimentation in a relatively short period of detention.

DIALYSIS. The separation of a colloid from a substance in true solution by allowing the solution to diffuse through a parchment membrane.

DICHROMATE OXYGEN DEMAND. The quantity of oxygen consumed by a liquid containing organic matter from a specified acidic solution of potassium dichromate on refluxing for two hours. A correction should be made for chlorides, since they are oxidized by dichromate in acid medium.

DIFFUSER. A porous plate or tube through which air is forced and divided into minute bubbles for diffusion in liquids. Commonly made of carborundum, alundum, or silica sand.

DIGESTER. See **TANK, SLUDGE-DIGESTION.** Erroneously termed digestor.

DIGESTION. The anaerobic decomposition of organic matter, resulting in partial gasification, liquefaction, and mineralization.

DIGESTION, CONSECUTIVE. Digestion of sludge under thermophilic conditions, followed by digestion and concentration under mesophilic conditions.

MESOPHILIC. Digestion by biological action at or below 113°F.

SLUDGE. The process by which organic or volatile matter in sludge is gasified, liquefied, mineralized, or converted into more stable organic matter, through the activities of living organisms.

STAGE. The digestion of sludge progressively in several tanks arranged in series.

THERMOPHILIC. Digestion carried on at a temperature generally between 113 and 145°F.

DILUTION. (1) A method of disposing of sewage, industrial waste, or sewage treatment plant effluent by discharging it into a stream or body of water; (2) The ratio of volume of flow of a stream to the total volume of sewage or sewage treatment plant effluent discharged into it.

DISINFECTION. The killing of the larger portion (but not necessarily all) of the harmful and objectional microorganisms in, or on, a medium by means of chemicals, heat, ultraviolet light, etc.

DISPERSION. The mixing of polluted fluids with a large volume of water in a stream or other body of water.

DISTRIBUTOR. A device used to apply liquid to the surface of a filter or contact bed, of two general types, fixed or movable. The fixed type may consist of perforated pipes or notched troughs, sloping boards, or sprinkler nozzles. The movable type may consist of rotating disks or rotating, reciprocating, or traveling perforated pipes or troughs applying a spray, or a thin sheet of liquid.

DOME, GAS. In sludge digestion tanks, usually a steel cover floating on the gas overlying the sludge.

DORTMUND TANK. See **TANK, DORTMUND.**

DOSE, CHLORINE. The amount of chlorine applied to a liquid, usually expressed in parts per million.

DOSING TANK. See **TANK, DOSING.**

DRAIN. (1) A conduit or channel constructed to carry off, by gravity, liquids other than sewage or industrial wastes, including surplus underground, storm, or surface water; it may be an open ditch, lined or unlined, or a buried pipe; (2) In plumbing, any pipe which carries water or waterborne wastes in a building drainage system.

E

EARTH. The softer materials of the lithosphere, commonly termed soil, as distinguished from firm rock. Its basic constituents are the products of rock disintegration, glaciation, and erosion, consisting of boulders, cobbles, pebbles, gravel, sand, silt, and clay, the latter in both particle and colloidal form. It includes material of organic, diatomaceous, or volcanic origin.

EARTH, DIATOMACEOUS. Extremely porous earth composed essentially of the siliceous skeletons of diatoms, which are extremely minute unicelled organisms.

EDDY. A circular movement occurring in flowing water, caused by currents set up in the water by obstructions or irregularities in the banks or bottom of the channel.

EFFICIENCY. The relative results obtained in any operation in relation to the energy or effort required to achieve such results. It is the ratio, expressed as percentage, of the total output to the total input.

EFFICIENCY, FILTER. The operating results from a filter as measured by various criteria such as percentage reduction in suspended matter, total solids, biochemical oxygen demand, bacteria, color, etc.

EFFLUENT. (1) A liquid which flows out of a containing space; (2) Sewage, water, or other liquid, partially or completely treated, or in its natural state, as the case may be, flowing out of a reservoir, basin, or treatment plant, or part thereof.

EFFLUENT, STABLE. A treated sewage which contains enough oxygen to satisfy its oxygen demand.

ELUTRIATION. A process of sludge conditioning in which certain constituents are removed by successive decantations with fresh water or plant effluent, thereby reducing the demand for conditioning chemicals.

EQUIVALENT, POPULATION. (1) The calculated population which would normally contribute the same amount of biochemical oxygen demand (B O D) per day. It may be estimated by the following formula: PE = (Flow) (B O D) (8.34)/X, where PE is the population equivalent of the waste; the flow of waste is in millions of gallons or fraction thereof per day; the B O D is in parts per million; 8.34 is the pounds per gallon of waste (assuming a specific gravity of 1.0); and X is the unit of normal sewage strength in pounds of B O D per capita, 0.17 being commonly used; (2) For an industrial waste, the estimated number of people contributing sewage equal in strength to a unit volume of the waste or to some other unit involved in producing or manufacturing a particular commodity. In a slaughterhouse the unit basis may be one animal killed.

F

FACTOR, DILUTION. The ratio, usually expressed in percentage, of the quantity of untreated sewage or partly or completely treated effluent, to the average quantity of diluting water available effective at the point of disposal.

FEEDER, CHEMICAL. A mechanical device for applying, either in the dry or liquid form, chemicals to water or sewage at a rate controlled manually, or automatically, by the rate of flow.

FILM, MICROBIAL. The gelatinous film of zoogleal growths covering the media or spanning the interstices of a biological bed.

FILTER. A device or structure for removing solid or colloidal material, usually of a type that cannot be removed by sedimentation, from water, sewage, or other liquid. The liquid is passed through a filtering medium, which may consist of a granular material such as sand,

infusorial, or diatomaceous earth, anthracite coal, etc, finely woven cloth, unglazed porcelain, or even specially prepared paper.

FILTER, HIGH-CAPACITY. See **FILTER, HIGH-RATE.**

HIGH-RATE. A trickling filter operated at a high average daily dosing rate usually between 10 mgd to 30 mgd per acre, sometimes including recirculation of effluent.

LOW-RATE. A trickling filter designed to receive a small load of B O D per unit volume of filtering material and to have a low dosage rate per unit of surface area (usually 1 to 4 mgd per acre). Also called **STANDARD RATE FILTER.**

SLUDGE. A device in which wet sludge, usually conditioned by a co-coagulant, is partly dewatered by means of vacuum or pressure.

SPRINKLING. A trickling filter in which the sewage is applied by spray from fixed nozzles.

TRICKLING. A filter consisting of an artificial bed of coarse material, such as broken stone, clinkers, slate, slats, or brush, over which sewage is distributed and applied in drops, films, or spray, from troughs, drippers, moving distributors, or fixed nozzles, and through which it trickles to the underdrains, giving opportunity for the formation of zoogleal slimes which clarify and oxidize the sewage.

VACUUM. A filter consisting of a cylindrical drum mounted on a horizontal axis, covered with a filter cloth, revolving with a partial submergence in liquid. A vacuum is maintained under the cloth for the larger part of a revolution to extract moisture. The cake is scraped off continuously.

FILTRATE. The effluent of a **FILTER.**

FILTRATION, BIOLOGICAL. The process of passing a liquid through a biological filter containing media on the surfaces of which zoogleal films develop which absorb and adsorb fine suspended, colloidal, and dissolved solids, and release end products of biochemical action.

FLOAT, CONTROL. A float installed in a tank or body of liquid to control the pumps.

FLOC. Small gelatinous masses, formed in a liquid by the addition of coagulants thereto or through biochemical processes or by agglomeration.

FLOCCULATION. The formation of flocs.

FLOCCULATOR. An apparatus for the formation of floc in water or sewage.

FLOODING, FILTER. The filling of a trickling filter to an elevation above the top of the media by closing all outlets in order to reduce or control the nuisance of filter flies.

FLOTATION. A method of raising suspended matter to the surface of the liquid in a tank as scum———by aeration, by the evolution of gas, chemicals, electrolysis, heat, or bacterial decomposition———and the subsequent removal of the scum by skimming.

FLOW, DRY-WEATHER. The flow of sewage in a sewer during dry weather. Such flow consists mainly of sewage and wastes, with no storm water included.

RADIAL. Direction of flow across a tank from center to periphery or vice versa.

STORM. That portion of the flow of a stream or storm drain resulting from storm water.

FLUME. An open conduit, constructed of wood, masonry, or metal, and constructed on a grade; sometimes elevated.

FLUME, PARSHALL. A device developed by Parshall, for measuring the flow of liquid in an open conduit. It consists essentially of a contracting length, a throat, and an expanding length.

VENTURI. An open flume with a contracted throat which causes a drop in the hydraulic grade line. It is used for measuring flow.

FOAMING, SLUDGE. An increase in the gas in sludge in Imhoff and separate digestion tanks causing large quantities of froth, scum, and sludge, to rise and overflow from openings at or near the top of the tanks.

FREEBOARD. The vertical distance between the normal maximum level of the surface of the liquid in a conduit, reservoir, tank, canal, etc., and the top of the sides of an open conduit, the top of a dam or levee, etc, which is provided so that waves and other movements of the liquid will not overtop the confining structure.

FUNGI. Small nonchlorophyll-bearing plants which lack roots, stems, or leaves and which occur (among other places) in water, sewage, or sewage effluents, growing best in the absence of light. Their decomposition after death may cause disagreeable tastes and odors in water; in some sewage treatment processes they are helpful and in others they are detrimental.

G

GAS, SEWAGE. (1) The gas produced by the septicization of sewage; (2) The gas produced during the digestion of sewage sludge, usually collected and utilized. Also called **SLUDGE-DIGESTION GAS.**

SLUDGE-DIGESTION. SEE GAS, SEWAGE (2).

GASIFICATION. The transformation of sewage solids into gas in the decomposition of sewage.

GRINDER, SCREENINGS. A device for grinding, shredding, or macerating material removed from sewage by screens.

GRIT. The heavy mineral matter in water or sewage, such as sand, gravel, cinders, etc.

GROWTH, AQUATIC. See **PLANKTON.**

H

HARDNESS. A characteristic of water, chiefly due to the existence therein of the carbonates and sulfates and occasionally the nitrates and chlorides of calcium, iron, and magnesium, which causes "curdling" of the water when soap is used, an increased consumption of soap, the deposition of scale in boilers, injurious effects in some industrial processes, and sometimes objectionable taste in the water. It is commonly computed from the amounts of calcium and magnesium in the water and expressed as equivalent calcium carbonate.

HARDNESS, CARBONATE. Hardness caused by the presence of carbonates and bicarbonates of calcium and magnesium in water. Such hardness may be removed to the limit of solubility by boiling the water. Formerly called **TEMPORARY HARDNESS.**

NONCARBONATE. Hardness caused by sulfates and compounds other than bicarbonates, which cannot be reduced materially by boiling the water. Formerly called **PERMANENT HARDNESS, SULFATE HARDNESS,** or **INCRUSTANTS.**

TOTAL. The sum of carbonate hardness and noncarbonate hardness.

HEAD, HYDRAULIC. (1) The height of the free surface of a body of water above a given point beneath the surface; (2) The height of the hydraulic grade line above the center line of a pressure pipe, at a given point.

HEAD, STATIC. The vertical distance between the free level of the source of supply, and the point of free discharge, or the level of the free surface.

WEIR. The distance from the crest of a weir to the water surface behind the weir.

HISTOGRAPH. A map or chart of a river, drainage or sewer system, upon which a series of time lines are placed. These time lines give the time of transit of water, originating on a time line, to flow down to the outlet of the system.

HOLDER, SLUDGE GAS. A tank used for the storage of gas collected from sludge-digestion tanks, for the purpose of stabilizing the flow of gas to the burners, maintaining a nearly constant pressure, and supplying gas during periods when the digestion tanks are temporarily out of service, or when gas production is low.

HYDROGRAPH. A graph showing, for a given point on a stream or conduit, the stage, velocity of flow, available power, or other function of the discharge with respect to time.

I

IMHOFF TANK. See **TANK, IMHOFF.**

INDEX, POLLUTIONAL. A criterion by which may be measured the degree of pollution in a stream, as indicated by bacterial counts, plankton, biochemical oxygen demand, or quantity of dissolved oxygen.

INFILTRATION. (1) The quantity of ground water which leaks into a sanitary sewer through defective joints; (2) The entrance of water from the ground into a sewer through breaks, defective joints, or porous walls.

INFLUENT. Sewage, water, or other liquid, raw or partly treated, flowing into a reservoir, basin, or treatment plant, or part thereof.

INTERCEPTOR. See **SEWER, INTERCEPTING.**

L

LAGOON, SLUDGE. A relatively shallow basin, or natural depression, used for the storage or digestion of sludge, and sometimes for its ultimate detention or dewatering.

LIQUEFACTION. The changing of the organic matter in sewage from an insoluble to a soluble state, and effecting a reduction in its solid contents.

LOAD, POLLUTIONAL. The quantity of polluting material discharged into a body of water; the pollutional load imposed upon sewage treatment works expressed as the contributing population.

LOADING, B O D. See **LOADING, FILTER.**

FILTER. The pounds of oxygen demand in the applied liquid per unit of filter bed area or volume.

M

MACHINE, SLUDGE STRIPPING. A mechanical device for removing air-dried sludge from sludge drying beds.

MANHOLE. An opening by which a man may enter or leave a sewer, conduit, or other closed structure for inspection, cleaning, and other maintenance operations, closed by a removable cover.

MANHOLE, JUNCTION. A manhole at the junction of two or more sewers.

MATRIX, ZOOGLEAL. The floc formed primarily by slime-producing bacteria in the activated sludge process, or in biological beds.

METER, CURRENT. A device for determining the velocity of water, flowing in a stream, open channel, or conduit, by ascertaining the speed at which elements of the flowing water rotate a vane or series of cups.

VENTURI. A meter for measuring flow of water or other fluid through closed conduits or pipes, consisting of a Venturi tube and one of several proprietary forms of flow registering devices.

METERING, VELOCITY-AREA. A method of measuring the discharge of streams and open channels by determining the velocity of the flowing water and measuring the cross-sectional area at the point of determination.

MGAD. Million gallons per acre per day.

MGD. Million gallons per day.

MOST PROBABLE NUMBER (M P N). See **NUMBER, MOST PROBABLE (M P N)**

N

NAPPE. The sheet or curtain of water overflowing a weir or dam. When freely overflowing any given structure it has a well-defined upper and lower surface.

NITRIFICATION. The oxidation of organic nitrogen into nitrates through biochemical action.

NUMBER, INDICATED. (I N). In the testing of bacterial density by the dilution method, the number obtained by taking the reciprocal of the highest possible dilution (smallest quantity of sample) in a decimal series.

MOST PROBABLE (M P N). In the testing of bacterial density by the dilution method, that number of organisms per unit volume which, in accordance with statistical theory, would be more likely than any other possible number to yield the observed test result or which would yield the observed test result with the greatest frequency. Expressed as density of organisms per 100 ml.

RELATIVE STABILITY. Methylene Blue Test—The results obtained by the methylene blue test (samples incubated for a definite period, usually 5 days, with a specific amount of methylene blue) are sometimes referred to (but erroneously) as relative stability numbers. In general, the results are not a true **RELATIVE STABILITY.** Such tests may be of value on a well-purified effluent as an indicator of condition.

O

ODOR THRESHOLD. The point at which, after successive dilutions with odorless water, the odor of the water sample can just be detected. The threshold odor is expressed quantitatively by the number of times the sample is diluted with odorless water.

ORGANISMS, INDEX. Microscopic organisms whose presence or absence in bodies of water indicates absence or presence and extent of pollution or other specific factor under study.

OUTFALL. The point or location where sewage or drainage discharges from a sewer, drain, or conduit.

OUTFALL, SEWER. The outlet, or structure, through which sewage is finally discharged.

OUTLET, TIDAL. An outlet of a drainage system discharging into the sea or ocean, which operates only when the water surface due to the tide is at a sufficiently low elevation to allow outflow.

OVERFLOW. Any device or structure over which any excess water or sewage beyond the capacity of the containers is allowed to flow to waste.

OVERFLOW, STORM. A weir, orifice, or other device for permitting the discharge from a combined sewer of that part of the flow in excess of that which the sewer is designed to carry.

OVERSEPTICIZATION. Anaerobic decomposition of sewage to such a point that its biological characteristics are established in a way which cannot completely or readily be modified.

OXIDANT. A substance, as dissolved oxygen, nitrite, nitrate, sulfate, etc., which gives up oxygen in the oxidation of organic matter. Water may be a source of oxygen under anaerobic conditions.

OXIDATION, BIOCHEMICAL. See **OXIDATION, SEWAGE.**

DIRECT. Oxidation of substances in sewage without the benefit of living organisms, by the direct application of air or oxidizing agents such as **CHLORINE.**

SEWAGE. The process whereby, through the agency of living organisms in the presence of oxygen, the organic matter contained in sewage is converted into a more stable or a mineral form.

OXYGEN, AVAILABLE. The quantity of atmospheric oxygen dissolved in the water of a stream. It is the quantity of dissolved oxygen available for the oxidation of organic matter in sewage.

DISSOLVED. Usually designated as DO. The oxygen dissolved in sewage water or other liquid expressed in parts per million or per cent of saturation.

OXYGEN CONSUMED (O C). See **OXYGEN CONSUMED FROM PERMANGANATE (O C).**

OXYGEN CONSUMED FROM PERMANGANATE (O C). The quantity of oxygen taken up by a liquid containing organic matter from an acidic or alkaline solution of potassium permanganate. Commonly regarded as an index of the carbonaceous matter present. The time, temperature and concentration of permanganate and acid or alkali must be specified. An alkaline solution is generally used only on waters high in chloride.

P

PARTS PER MILLION. Parts by weight in water and sewage analysis. Frequently a density of 1.0 is assumed and measurements are made on a volumetric basis. Abbreviation is *p p m.*

PERIOD, AERATION. (1) The theoretical time, usually expressed in hours, that the mixed liquor is subjected to aeration in an aeration tank undergoing activated sludge treatment; is equal to (a) the volume of the tank divided by (b) the volumetric rate of flow of the sewage and return sludge; (2) The theoretical time that water is subjected to aeration.

PIEZOMETER. An instrument for measuring pressure head in a conduit, tank, soil, etc. It usually consists of a small pipe or tube tapped into the side of the container, the inside end being flush with, and normal to, the water face of the container, connected with a manometer pressure gage, mercury or water column, or other device for indicating pressure head.

PITOT TUBE. See **TUBE, PITOT.**

PLANKTON. An assemblage of drifting organisms, usually microscopic, consisting of blue-green algae, bacteria, diatoms, desmids, etc., occurring in ponds, lakes and rivers.

POLLUTION. The addition of sewage, industrial wastes, or other harmful or objectionable material to water. See also **CONTAMINATION.**

POPULATION EQUIVALENT. See **EQUIVALENT, POPULATION.**

POTABLE. See **WATER, POTABLE.**

POTAMOLOGY. That branch of hydrology pertaining to streams.

POTENTIAL, OXIDATION-REDUCTION. The electrometric potential existing between any solution and a standard hydrogen electrode. Positive potentials indicate a state of the environment which is predominantly oxidizing or aerobic; negative potentials indicate a state which is predominantly reducing or anaerobic in nature.

PRE-AERATION. A preparatory treatment of sewage comprising aeration to remove gases, add oxygen, or promote flotation of grease, and aid **COAGULATION.**

PRECHLORINATION. (1) Chlorination of water prior to filtration; (2) Chlorination of sewage prior to treatment.

PRECIPITATION. The phenomenon which occurs when a substance held in solution in a liquid passes out of solution into solid form.

PRECIPITATION, CHEMICAL. Precipitation induced by addition of chemicals.

PRESS, FILTER. A press operated mechanically for partially dewatering sludge.

PRESSING, SLUDGE. The process of dewatering sludge by subjecting it to pressure, the solids being retained, usually by a cloth fabric through which the water passes.

PROCESS, ACTIVATED SLUDGE. A biological sewage treatment process in which a mixture of sewage and activated sludge is agitated and aerated. The activated sludge is subsequently separated from the treated sewage (mixed liquor) by sedimentation, and wasted or returned to the process as needed. The treated sewage overflows the weir of the settling tank in which separation from the sludge takes place.

PROCESS, BIOLOGICAL. The process by which the life activities of bacteria, and other microorganisms in the search for food, break down complex organic materials into simple, more stable substances. Self-purification of sewage-polluted streams, sludge digestion, and all so-called secondary sewage treatments result from this process. Also called **BIOCHEMICAL PROCESS.**

SCOTT-DARCEY. A process of purifying water in which the coagulant (crude ferric chloride) is made by passing chlorine gas in aqueous solution over iron scrap.

PROPORTIONER, CHEMICAL. See **FEEDER, CHEMICAL.**

PROTEOLYSIS. The change affected in proteids during their digestion, that is, reduction and oxidation.

PROTOZOA. Small one-celled animals including amoebae, ciliates, and flagellants.

PUMPAGE. The total quantity of liquid pumped in a given interval, usually a day, a month, or a year.

PUTREFACTION. Biological decomposition of organic matter with the production of ill-smelling products associated with anaerobic conditions.

PUTRECIBILITY. (1) The relative tendency of organic matter to undergo decomposition in the absence of oxygen; (2) The susceptibility of waste waters, sewage, effluent, or sludge to putrefaction.

Q

QUALITY, WATER. A term used to describe the chemical, physical, and biological characteristics of water in respect to its suitability for a particular purpose. The same water may be of good quality for one purpose or use, and bad for another, depending upon its characteristics and the requirements for the particular use.

R

RACK, BAR. A screen composed of parallel bars, either vertical or inclined, placed in a waterway to catch floating debris, and from which the screenings may be raked. Also called rack.

RAPIDS. A stretch of a stream where the flow is very swift and turbulent, without any pronounced falls.

RATE, FILTRATION. The rate of application of water or sewage to a filter, usually expressed in million gallons per acre per day, or gallons per minute per square foot.

INFILTRATION. (1) The rate at which infiltration takes place expressed in depth of water per unit time, usually in inches per hour; (2) The rate, usually expressed in cubic feet per second, or million gallons per day per mile of waterway, at which ground water enters an infiltration ditch or gallery, drain, sewer, or other underground conduit.

OXIDATION. The rate at which the organic matter in sewage is stabilized.

RATIO, DISTRIBUTION. The ratio of what the daily average rate of application of sewage to a high-rate filter would be, if sewage were applied to the entire surface of the filter at the mean maximum momentary rate of application continuously for 24 hours, to what the average daily application actually is.

DOSING. The maximum rate of application of sewage to a filter on any unit of area, divided by the average rate of application on that area.

REAERATION. The absorption of oxygen by a liquid, the dissolved oxygen content of which has been depleted.

REAERATION, SLUDGE. The continuous aeration of sludge after its initial aeration in the activated sludge process.

RECARBONATION. The diffusion of carbon-dioxide gas through water to restore the carbon dioxide removed by adding lime to water in water softening.

RECHLORINATION. The application of chlorine to water at one or more points in the water distribution system following previous chlorination.

RECIRCULATION. (1) The refiltration of all or a portion of the effluent in a high-rate trickling filter for the purpose of maintaining a uniform high rate through the filter; (2) The return of effluent to the incoming flow to reduce its strength.

RECORDER. A device that makes a graph of the stage, pressure, depth, velocity, or the movement or position of water-controlling devices.

RECORDER, RATE-OF-FLOW. A recorder indicating the rate of flow of water; it is generally applied to a rapid sand filter.

WATER-LEVEL. A device for producing, graphically or otherwise, a record of the rise and fall of a water surface, with respect to time.

REDUCTANT. Organic matter in streams and sewage which is stabilized under anaerobic conditions.

REDUCTION, SLUDGE. The reduction in the quantity and change in character of sewage sludge as the result of digestion.

REGULATOR. A device or apparatus for controlling the quantity of sewage admitted to an intercepting sewer or a unit of a sewage treatment plant.

REOXYGENATION. The replenishment of oxygen in a stream from (1) dilution water entering stream, (2) biological reoxygenation through the activities of certain oxygen-producing plants, and (3) atmospheric reaeration.

RESERVOIR, EQUALIZING. A reservoir interposed in a water supply system at any point between source and consumer for the purpose of furnishing elasticity of operation to the distribution system so that different portions of the system may be more or less independent of each other. Also called **BALANCING RESERVOIR** and **COMPENSATING RESERVOIR.**

SETTLING. A reservoir used for the storage of turbid water for the purpose of sedimentation.

RESIDUAL, CHLORINE. The quantity of chlorine, in excess of the **CHLORINE DEMAND,** remaining in water, sewage, or effluents after a selected contact period of time, expressed in parts per million. The difference between the chlorine dose and the chlorine demand.

RIESELER. An aerator combined with a coke filter for the removal of iron and other dissolved mineral matter from water.

RIFFLE. A shallow rapids in an open stream, where the water surface is broken into waves by obstructions wholly or partly submerged.

RIGHTS, RIPARIAN. The legal right which assures to the owner of land abutting upon a stream or other natural body of water the use of such water.

RUN, FILTER. The interval between the cleaning or washing operations of a rapid sand filter.

RUNOFF. (1) That part of the precipitation which reaches a stream, drain, or sewer (2) Total discharge of (1) during a specified time.

S

SALINITY. The relative concentration of salts, usually sodium chloride, in a given water. It is usually expressed in terms of the number of parts per million of chlorine (Cl).

SAMPLE, COMPOSITE SEWAGE. A combination of individual samples of sewage taken at selected intervals generally hourly for 24 hours, to minimize the effect of the variability of the individual sample. Individual samples may have equal volumes, or be roughly proportioned to the flow at time of sampling.

GRAB. A single sample of sewage.

SANITATION, WATERSHED. The removal of actual and the prevention of potential sources of pollution on a watershed; also measures and methods undertaken to minimize unavoidable pollution, or to improve the quality of water for potable use.

SCHMUTZDECKE. A "dirty skin" or layer of flocculent material that forms on the surface of a sand filter.

SCREEN. A device with openings, generally of uniform size, used to retain or remove suspended or floating solids in flowing water or sewage, and to prevent them from entering an intake or passing a given point in a conduit. The screening element may consist of parallel bars, rods, wires, grating, wire mesh, or perforated plate, and the openings may be of any shape, although they are generally circular or rectangular.

SCREEN, BAND. An endless band or belt of wire mesh, bars, plates, or other screening medium which passes around upper and lower rollers as guides, and from which the material caught on the screen is usually removed by gravity, by brushes, or by other means. Also called **BELT SCREEN.**

COARSE. A relative term, applicable to mesh or bar screens when the openings are greater than 1 in in least dimension, except in case of racks.

COMMINUTING. A mechanically operated device for screening sewage, and cutting the screenings into particles sufficiently fine to pass through the screen openings.

FINE. A relative term, usually applied to screens with openings less than 1 in.

FISH. A screen placed across the head of, or in, an intake canal or pipe line, to prevent fish from entering.

SCREENING. The removal of relatively coarse floating and suspended solids by straining through racks or screens.

SCUM. A mass of sewage matter which floats on the surface of sewage.

SECOND-FOOT. An abbreviated expression for cubic feet per second.

SEDIMENT. (1) Any material carried in suspension by water, which will ultimately settle to the bottom after the water loses velocity; (2) Fine waterborne matter deposited or accumulated in beds.

SEDIMENTATION. The process of subsidence and deposition of suspended matter carried by water, sewage, or other liquids, by gravity. It is usually accomplished by reducing the velocity of the liquid below the point where it can transport the suspended material.

SEDIMENTATION, FINAL. Settling of partly settled flocculated or oxidized sewage in a final tank.

SEEDING, SLUDGE. The inoculation of undigested sewage solids with sludge that has undergone decomposition, for the purpose of introducing favorable organisms, thereby accelerating the initial stages of digestion.

SEEPAGE. The slow movement of water through small cracks, pores, interstices, etc, of a material into or out of a body of surface or subsurface water.

SELF-PURIFICATION. The natural processes of purification of pollution in a moving or still body of water whereby the bacterial content is reduced, the B O D is largely satisfied, the organic content is stabilized, and the dissolved oxygen returned to normal.

SEPTICIZATION. A term applied to anaerobic decomposition, whereby, intensive growths of bacteria with the enzymes secreted by them liquefy and gasify solid organic matters.

SEWAGE. Largely the water supply of a community after it has been fouled by various uses. From the standpoint of source it may be a combination of the liquid or water-carried wastes from residences, business buildings, and institutions, together with those from industrial establishments, and with such ground water, surface water, and storm water as may be present.

SEWAGE, COMBINED. A sewage containing both sanitary sewage and surface or storm water with or without industrial wastes.

CONCENTRATED. A strong sewage containing a relatively high amount of suspended solids and B O D.

DILUTE. Sewage containing less than 150 ppm of suspended solids and B O D (weak sewage).

DISINFECTED. Crude sewage or sewage treatment plant effluent which has been treated with a disinfecting agent, commonly chlorine, or bleach, resulting in sufficient destruction of a sufficient number of pathogenic organisms to reduce materially the danger of infection.

DOMESTIC. Sewage derived principally from dwellings, business buildings, institutions, and the like.

FRESH. Sewage of recent origin containing dissolved oxygen at the point of examination.

INDUSTRIAL. Sewage in which industrial wastes predominate. See **SEWAGE, DOMESTIC; WASTES, INDUSTRIAL.**

OXIDIZED. Sewage in which the organic matter has been stabilized.

RAW. Sewage prior to receiving any treatment.

SANITARY. Domestic sewage with storm and surface water excluded.

SEPTIC. Sewage undergoing putrefaction under anaerobic conditions.

SETTLED. Sewage from which most of the settleable solids have been removed by sedimentation.

STALE. A sewage containing little or no oxygen, but as yet free from putrefaction.

STERILIZED. An effluent from a sewage treatment plant in which all organisms have been destroyed.

TREATED. A sewage which has received partial or complete treatment.

SEWER. A pipe or conduit, generally closed, but normally not flowing full, for carrying sewage and other waste liquids.

SEWER, COMBINED. A sewer receiving both surface runoff and sewage.

DEPRESSED. A section of sewer constructed lower than adjacent sections, to pass beneath a valley, watercourse, or other obstruction. It runs full or at greater than atmospheric pressure because its crown is depressed below the hydraulic grade line.

INTERCEPTING. A sewer which receives dry-weather flow from a number of transverse sewers or outlets and frequently additional predetermined quantities of storm water (if from a combined system), and conducts such waters to a point for treatment or disposal.

LATERAL. A sewer which discharges into a branch or other sewer and has no other common sewer tributary to it.

SANITARY. A sewer which carries sewage and to which storm, surface, and ground waters are not intentionally admitted.

STORM. A sewer which carries storm water and surface water, street wash and other wash waters, or drainage, but excludes sewage and industrial wastes. Also called **STORM DRAIN.**

STORM OVERFLOW. A sewer used to carry the excess of storm flow from a main or intercepting sewer to an independent outlet.

SEWER OUTFALL. A sewer which receives the sewage from a collecting system and carries it to a point of final discharge.

SILT. Soil particles which constitute the physical fraction of a soil between 0.005 mm and 0.05 mm in diameter.

SKIMMER, GREASE. A device for removing floating grease or scum from the surface of sewage in a tank.

SKIMMINGS. Grease and scum skimmed from sewage settling tanks.

SLEEK. The thin oily film usually present which gives a characteristic appearance to the surface of water into which sewage or oily waste has discharged. Also termed **SLICK.**

SLOUGHING. The phenomenon associated with trickling filters and contact aerators, whereby slime and solids accumulated in the media are discharged with the effluent.

SLUDGE. The accumulated settled solids deposited from sewage or industrial wastes, raw or treated, in tanks or basins, and containing more or less water to form a semi-liquid mass.

SLUDGE, ACTIVATED. Sludge floc produced in raw or settled sewage by the growth of zoogleal bacteria and other organisms in the presence of dissolved oxygen, and accumulated in sufficient concentration by returning floc previously formed.

CHEMICAL. Sludge obtained by treatment of sewage with chemicals.

COMMERCIALLY DRY. Sludge containing not more than 10% of moisture by weight; the limit is 5% in the fertilizer trade.

DIGESTED. Sludge digested under anaerobic conditions until the volatile content has been reduced, usually around 50%.

LIQUID. Sludge containing sufficient water (or-

dinarily above 85%) to permit flow by gravity or to be pumped.

SLUDGE DEWATERING. The process of removing a part of the water in sludge by any method, such as draining, evaporation, pressing, centrifuging, exhausting, passing between rollers, or acid flotation, with or without heat. It involves reducing from a liquid to a spadable condition rather than merely changing the density of the liquid (concentration) on the one hand or drying (as in a kiln) on the other.

SPACE, SCUM. The space provided in an Imhoff tank for the accumulated scum rising from the digestion compartment.

SQUEEGEE. (1) A device, generally with a soft rubber edge, used for dislodging and removing deposited sewage solids from the waste and bottoms of sedimentation tanks. (2) The metal blades attached to the lower arms of a clarifier mechanism to move the sludge along the tank bottom.

STANDARD METHODS. Methods of analysis of water, sewage, and sludge approved by a Joint Committee of the American Public Health Association, American Water Works Association, and Federation of Sewage Works Associations.

STERILIZATION. The destruction of all living organisms, ordinarily through the agency of heat or of some chemical.

STREAM. A body of flowing water. The term is usually applied to a body of water flowing in a natural surface channel, but is also applied to a body of water flowing in a well-defined, open or closed conduit, a jet of water issuing from any opening, such as a nozzle, a fissure in rock, etc.

STRUM. A strainer, or the like, to prevent the entrance of solid matter into a pump chamber or suction pipe.

SUBSTRATE. The liquor in which activated sludge is kept in suspension.

SUMP. In plumbing, a tank or pit which receives the discharge from subdrains and from which the discharge is pumped or ejected into a drainage system.

SUPERNATANT. Floating on surface, like oil on water, or the watery layer which forms in sludge digestion tanks by compacting of the sludge solids.

SYMBIOSIS. Biological action which promotes putrefaction and oxidation.

SYSTEM, SEWERAGE. A system of sewers and appurtenances for the collection, transportation and pumping of sewage and industrial wastes.

T

TANK, DETRITUS. A detention chamber larger than a grit chamber, usually with provision for removing the sediment without interrupting the flow of sewage.

TANK, DORTMUND. A vertical flow sedimentation tank with a hopper bottom, used in sewage treatment. The sewage, introduced near the bottom of the tank, rises and overflows at the surface; the sludge may be removed from the bottom at frequent intervals.

DOSING. A tank into which raw or partly treated sewage is introduced and held until the desired quantity has been accumulated, after which it is discharged at such a rate as may be necessary for the subsequent treatment.

FINAL SETTLING. A tank through which the effluent from a trickling filter, or aeration or contact aeration tank flows for the purpose of removing the settleable solids. Also called **FINAL SETTLING BASIN.**

FLOCCULATING. A tank used for the formation of floc by the agitation of liquids.

GREASE REMOVAL. A tank designed to facilitate the flotation of oil and grease and provided with a device for their removal.

HYDROLYTIC. In general, any sewage tank in which hydrolysis occurs, specifically applied to a special form of vertical flow tank. General term, for any sedimentation tank in which a part of the suspended organic matter is liquefied and gasified by biochemical processes.

IMHOFF. A deep two-storied sewage tank originally patented by Karl Imhoff, consisting of an upper or continuous flow sedimentation chamber and a lower or sludge-digestion chamber. The floor of the upper chamber slopes steeply to trapped slots, through which solids may slide into the lower chamber. The lower chamber receives no fresh sewage directly, but is provided with gas vents and with means for drawing digested sludge from near the bottom.

MIXING. A tank or channel so designed as to provide a thorough mixing of chemicals introduced into liquids.

PRIMARY SETTLING. The first settling tank through which sewage is passed in a treatment works.

RADIAL FLOW. A circular tank in which the direction of flow is from the center to the periphery or vice versa.

SEDIMENTATION. A tank or basin, in which water, sewage, or other liquid containing settleable solids, is retained for a sufficient time, and in which the velocity of flow is sufficiently low, to remove by gravity a part of the suspended matter. Also called **SETTLING TANK.**

SLUDGE DIGESTION. A tank in which the solids resulting from the sedimentation of sewage are stored for the purpose of permitting anaerobic decomposition to the point of rendering the product non-putrescible and inoffensive.

TANKS, MULTIPLE DOSING. Two or more dosing tanks of equal capacity, each equipped with a dosing device, such devices usually being interconnected so that they fill and discharge the tanks alternately or in rotation.

THICKENER, SLUDGE. A type of sedimentation tank in which the sludge is permitted to settle, usually equipped with scrapers traveling along the bottom of the tank which push the settled sludge to a sump, from which it is removed by gravity or by pumping.

THICKENING, SLUDGE. The reduction of the moisture content of sludge in a sedimentation or digestion tank by means of a sludge thickener.

TRASH. Floating debris removed from reservoirs, combined sewers, and storm-water sewers by coarse racks.

TREATMENT, PRELIMINARY. (1) The conditioning of an industrial waste at its source prior to discharge, to remove or to neutralize substances injurious to sewers and treatment processes or to effect a partial reduction in load on the treatment process; (2) In the treatment process, unit operations which prepare the liquor for subsequent major operations.

PRIMARY. The first major (sometimes the only) treatment in a sewage treatment works, usually sedimentation. The removal of a high percentage of suspended matter but little or no colloidal and dissolved matter.

SECONDARY SEWAGE. The treatment of sewage by biological or chemical methods after primary treatment by sedimentation.

TUBE, PITOT. A device for measuring the velocity of flowing water using the velocity head of the stream as an index of velocity. It consists essentially of an orifice held to a point upstream in the water, connected with a tube in which the rise of water due to velocity head may be observed and measured. It also may be constructed with an upstream and downstream orifice, with two water columns, in which case the difference in height of water column in the tubes is the index of velocity.

VENTURI. A closed conduit or pipe containing a gradual contraction, which causes a reduction of pressure head, by which the velocity may be determined. The contraction is generally followed, but not necessarily so, by an enlargement to the original size.

U

UNLOADING, FILTER. The periodic sloughing or unloading of the film on the filter stones of a trickling filter. In the case of a high rate filter, it may be continuous.

V

VALVE, FLOAT. A valve wherein the plug is actuated by a float to control the flow into a tank.

VELOCITY, MEAN. The average velocity of a stream flowing in a channel or conduit at a given cross section or in a given reach. It is equal to the discharge divided by the cross-sectional area of the section, or the average cross-sectional area of the reach. Also called **AVERAGE VELOCITY.**

SELF-CLEANSING. The minimum velocity in sewers necessary to keep solids in suspension and prevent their deposition, and the subsequent nuisances from stoppages and odors or decomposition.

SETTLING. The velocity at which subsidence and deposition of the settleable suspended solids in water and sewage will occur.

VENTILATION, BOTTOM. Movement of air through the media in a sewage filter, induced by a vent stack attached to the under drains, upward and to the surface.

VENTURI METER. See **METER, VENTURI.**

TUBE. See **TUBE, VENTURI**

VISCOSITY. The cohesive force existing between particles of a fluid which causes the fluid to offer resistance to a relative sliding motion between particles.

VISCOSITY, KINEMATIC. Ratio of absolute viscosity expressed in poises (grams per centimeter second) to the density in grams per cubic centimeter, at room temperature.

W

WASTES, INDUSTRIAL. The liquid wastes from industrial processes as distinct from domestic or sanitary sewage.

WATER, POLLUTED. Water that contains sewage, industrial waste, or other harmful or objectionable substances.

POTABLE. Water which does not contain objectionable pollution, contamination, minerals, or infection, and is considered satisfactory for domestic consumption.

SOFT. Water with a low content of dissolved mineral salts of calcium and magnesium.

STORM. The excess water running off from the surface of a drainage area during and immediately following a period of rain. It is that portion of the rainfall and resulting surface flow which is in excess of the infiltration capacity of the surface of the basin to absorb.

TAIL. Water discharged at the downstream end of a structure.

TREATED. Water which has been subjected to treatment processes.

WATER STANDARDS. Definitions of water quality established as a basis of control for various water use classifications.

WATERSHED. The area contained within a divide above a specified point on a stream. In water supply engineering, it is termed a **WATERSHED,** and in river control engineering, it is termed a **DRAINAGE AREA, DRAINAGE BASIN,** or **CATCHMENT AREA.**

WAVES OF POLLUTION. Successive masses of polluted water occurring at intervals in a moving body of water.

WEEK-SECOND-FOOT. A unit of volume equivalent to 1 cu ft per sec flowing for one week; 7 day-sec-ft; 604,800 cu ft; or 13,884 acre-ft.

WEIR, DIVERTING. A weir placed in a combined sewer for the purpose of diverting storm flow from the normal dry-weather direction. Also called an **OVERFLOW, OVERFALL,** or **SIDE-FLOW WEIR.**

MEASURING, FREE. A weir that is not submerged; a weir in which the tail water is below the crest or where the flow is not in any way affected by tail water.

MEASURING, RECTANGULAR. A weir whose notch is rectangular in shape.

MEASURING, TRIANGULAR. A weir whose notch is triangular in shape, usually used to measure very small flows.

PERIPHERAL. The outlet weir in a circular settling tank, extending around the inside of its circumference and over which the effluent discharges.

SUTRO. A specially shaped weir which provides constant velocity in the upstream chamber regardless of water depth. Used in grit chambers.

Y

YEAR, AVERAGE. A twelve-month period for which the total, or the mathematical mean, of observed quantities of hydrologic phenomena, such as precipitation, evaporation, temperature, stream flow, etc., approximates the mathematical mean of such observed quantities for a considerably longer period.

YEAR, CLIMATIC. A continuous twelve-month period during which a complete annual cycle occurs, arbitrarily selected for the presentation of data relative to hydrologic or meteorologic phenomena. The U. S. Geological Survey uses the period October 1st to September 30th in the publication of its records of stream flow. Also called **WATER YEAR.**

NORMAL. A year during which the precipitation or stream flow approximates the average for a long period of record.

Z

ZONE, LITTORAL. The strip along the shore line between the high and low water marks.

NEUTRAL. The zone in the settling comparment of an Imhoff tank, between the scum and the sludge.

ZOOGLEA. A jelly-like matrix developed by bacteria. The word is usually associated with activated sludge growths in biological beds.

• PATENT DIGEST •

PAUL WENGRAF

EMULSIFIED HYDROCARBONS USED AS THICKENERS——— D, 1

USPat 2,619,403
(Celanese Corp of America—Krause, —Wainwright) Nov 25, 1952

According to the patent, normal thickeners, such as starch gum, tragacanth, etc, are replaced by emulsions of water-in-oil (or preferably oil-in-water).

Pigment printing formulas, e g, of the Aridye-type, contain the well-known cellulose esters or cellulose ethers, resin condensates and the like, characterized as *film-forming* substances. In contrast thereto no film-forming agents, or at least *negligible amounts thereof,* are employed in the current invention. They are, as a rule, volatilized in the following aging operation or easily washed out in the final rinsing treatment, leaving no stiffness in the printed fabric.

Essentially the emulsions must be stable and not easily converted into compositions containing mixed types (i e, water-in-oil and oil-in-water) emulsions. An oil-in-water emulsion of over 20% and even up to 70-80% content of the oily phase is said to give stable pastes of the printing consistency required.

A necessary requisite is a low content of solids, obviously to make the paste flexible and to prevent solid deposits or hard-to-remove residues within the fibers. The solid content is limited to 15% and preferably should be below 10 and even 7.5%. Only a small portion of these solids (about 10%) might form water-soluble films.

It is also essential that the pastes be prevented from spreading over the outlines of the printed areas, analogous to the property of standard printing thickeners. Any decrease of surface tension of the continuous (aqueous) phase that might be brought about by the specific emulsifier has to be avoided. Thus anionic or cationic soaps are excluded from consideration, but some other emulsifying agents that do not substantially lower the surface tension, e g, sodium lignin sulfonate, lecithin, bentonite or one of the non-ionic polyethylene glycol fatty acid condensates, such as Tween 20 (polyoxyethylated sorbitan monolaurate) may qualify. The oily phase comprises kerosene or other cheap fractions of petroleum hydrocarbons, such as toluene, xylene or the like. Swelling agents, e g, glacial acetic acid, may be added for screen printing, but not for use in copper roller printing. For roller printing on acetate rayon the following formula is given: 1-4-diaminoanthraquinone, kerosene (76%), water (18.8%), the emulsifying agent sodium lignin sulfonate, "Tween" and "Span 20" (sorbitan monolaurate).

It is preferable to apply dyes having pronounced affinity to the fibers to be printed, i e, direct dyes on cotton or rayon, dispersible dyes on cellulose acetate, acid dyes on silk or wool and so on. In this case steaming or aging *without any subsequent aftertreatment* is sufficient to fix the dye, leaving the fabric in a uniform flexible state.

Discharge effects can be produced according to the same method.

Among the references cited by the Patent Office:

USPat 2,133,470 (Celanese/1938): preprinting direct or acid dyes on acetate rayon, cross-printing with a swelling agent (lactic acid, thiocyanate), steaming and rinsing; dyes are fixed on areas containing both dye and swelling agent only.

USPat 1,929,573 (Celanese/1933): printing effects on cellulose acetate by spraying thickened solutions of water-insoluble dyes dissolved in solutions that serve simultaneously as a solvent and fiber-swelling agent, e g, ethylene dichloride.

USPat 1,792,152 (Celanese/1931): adding swelling agents, especially thiocyanates or zinc chloride, to a printing paste for acetate rayon for better penetration.

Ger Pat 550,637 (Mocker/1932): using mineral oils to which small amounts of "Nekal AEM" have been added as printing thickeners.

Thickening agents based on oil emulsions have also been advocated in USPat 2,127,770 (Franz/1939) and Brit P 443,365 (Stoehr & Co/1936). They cover procedures in which higher aliphatic alcohols of C_8 and more are emulsified in water, using alkylsulfates or other higher fatty chains containing compounds as emulsifiers.

PIGMENT-PAD DYEING ACETATE FIBERS——Swelling Agent in Alkaline Bath C 4, 07

U S Pat 2,620,257
(Celanese Corp of America——Ward, Haggerty ——Dec 2, 1952)

Because of their sensitivity to strongly alkaline liquids, cellulose acetate fibers hitherto have not been dyed with vat dyes in the pigment-pad process. The prolonged immersion in the alkaline reducing bath, necessary for the complete development of the padded-on vat pigments, would weaken or completely saponify the goods.

It has been observed that, with the addition of an appropriate organic fiber-swelling agent to the alkali-hydrosulfite bath, the immersion period is shortened considerably. Examples of such agents are the lower aliphatic alcohols up to amyl alcohol, ketones, such as acetone or ethyl methyl ketone, or diacetone alcohol. (The latter compound is mentioned in both examples in the patent.) When applied, they constitute 20 to 50% of the dyebath. The temperature must be kept within the limits of 30-60°C, and the immersion time, between 15 and 90 seconds.

Example: a cellulose acetate fabric is padded at 40°C with an aqueous suspension of a mixture of Calcosol Brown G Paste and Calcosol Fast Yellow Paste; Sulfanol R (a sulfonated fatty acid amide) is used as a dispersant. The fabric is dried and passed (within 22 seconds) at 60°C through a bath of diacetone alcohol mixed about 1:2 with water, alkali and hydrosulfite. The reduction is found to be complete.

Goods are rinsed in cold water, re-oxidized with peroxide, rinsed again, scoured and finally tentered.

Among the references cited by the Patent Office:

U S Pat 2,518,153 (Du Pont/1950): padding acetate of cellulose with alkaline vats for a very short time (the solution containing some water-soluble alcohol, a swelling and dispersing agent and diethylene glycol) and then passing immediately thereafter through a weakly alkaline solution that does not saponify the fibers [cf *Am Dyestuff Reptr 40,* 67 (1951)].

U S Pat 2,248,048 (Celanese/1941): printing cellulose acetate with a paste containing a high-boiling solvent, such as diacetone alcohol, ethyl lactate, etc, and a highly viscous water-soluble hydroxyethylcellulose as a thickener.

Brit P 578,212 (Brit Celanese/1946): pigment-pad dyeing cellulose acetate by impregnating with an aqueous solution of the dye, drying, reducing with hydrosulfite and sodium carbonate at relatively low temperature and re-oxidizing.

French Pat 847,107 (Rivat/1939): vat dyeing (including pigment-pad dyeing of cellulose acetate) by adding a swelling agent, e g, methanol, other lower alcohols, acetone, ethyl lactate, etc.

French Pat 928,944 (Riverside and Dan River Mills/1947): uniformly dyeing mixtures of rayon and cellulose acetate with naphthols or solubilized vats by adding a lower alcohol, which acts as a swelling agent for the cellulose acetate component but does not change the dyeing properties of the cellulose component.

DYEING ACRYLONITRILE FIBERS with Azo Dyes in a Two-Bath Process C 4, 07

U S Pat 2,622,959
(Soc Rhodiaceta——Rampin——Dec 23, 1952)

As stated in the introduction to this patent, the dyeing of acrylonitrile polymer fibers with insoluble azo dyes requires three different baths: naphthol impregnation, acid passage, and developing with the diazotized base. Moreover the threads generally have to be dyed in a swollen, almost jellified state.

It has been found that satisfactory results may be attained in a two-bath process. The first step consists of impregnating with a mixture of the base in a free nonsulfonated state and the alkali salt of the naphthol; the second step, treating with a diazotizing solution of nitrous acid. It is essential that the temperature of the first bath be between 80 and 100°C, imparting the highest affinity of the base-naphthol mixture to the fiber. (The higher temperatures frequently used for dyeing acrylonitrile fibers are not recommended in this case.) The second bath, applied at 40-70°C, consists of nitrite plus sulfuric acid and a wetting agent as usual.

Examples refer to mixtures of β-naphthol or coupling agents of this class (including Naphthol AS compounds) with o-amino-azotoluene (Fast Garnet GB Base), p-nitra-aniline, alpha-naphthylamine, and so on. The components are mixed and pasted with a sulfonated alcohol amide (not defined) and caustic soda, and then dissolved in dilute alkaline solution. Polyacrylonitrile threads (not preswollen) are introduced into this bath, the temperature is raised within 30 minutes to the boiling point, sodium sulfate is added and boiling is continued for another hour. After the rinsing operation, the goods are diazotized as usual. Dark shades may be so obtained, while the aforementioned three-bath process is found to give only pale shades on nonswollen material.

References cited by the Patent Office:

USP 2,191,801 (Du Pont/1940): dyeings of especially good fastness may be obtained by using polyazo dyes containing a pyrazolone group, diazotized and developed with coupling components free of solubilizing (carboxy- or sulfonic acid) groups.

Rayon Textile Monthly, Sept, 1946, 140 (Hall): a discussion of factors influencing the dyeability of natural and synthetic fibers, e g, dye absorption of hydrophobic and pretreated fibers.

Am Dyestuff Reptr, May 2, 1945, P214 (Choquette): a review of the development of dyeing properties in synthetic fibers, especially nylon and mixtures containing nylon.

Am Dyestuff Reptr, April 22, 1946, P194-197 (Woodruff): a discussion of dyeing properties of Vinyon with dyestuffs of various classes.

An analogous procedure for *dyeing acetate fibers* has been developed by Rhodiaceta (cf Diserens, "Technology of Dyeing and Printing, Vol I p 240). It is interesting to note that this method, with certain modifications, can be used for dyeing acrylonitrile fibers with insoluble azo dyes.

MULTICOLOR PHOTOGRAPHIC PRINTS Produced Without Intermediate Washing D 1

U S Pat 2,623,821
(Calico Printers Ass'n——Isherwood, Miller——Dec 30, 1952)

Photographic printing methods are based on that property of certain dyes or components which enables them to be developed by actinic light or to be otherwise chemically influenced by light rays (for example, to serve as mordants for other dyes).

Examples of these basic methods, mentioned as prior art in this specification, include:

1) preparation in gelatin-dichromate solution, exposure to light in order to partly harden the Cr- compound, and use after rinsing as a mordant for chrome dyes;

2) impregnation with indigosol dyes and generation of the vat dyes on the light-exposed areas;

3) preparation with a diazotized solution of an amine, exposure to light to *destroy* the diazo product and development of the portions protected from light in a naphthol- or phenol-coupling bath*; and

4) conversion by light exposure of a stabilized "antidiazo" sulfonate into the reactive "syndiazo" form, and coupling with an alkali naphtholate that has been incorporated in the same solution.

These methods can be combined to produce multicolor prints by impregnating with one of the dye preparations, exposing, washing, impregnating with another solution, exposing, washing again and so forth. The principal drawback of such a procedure is that of dimensional change brought about by washing. It is practically impossible to obtain exact registration of the shades, which should combine to produce a harmonious multicolor image.

According to the present specification, this problem may be solved by maintaining the cloth to be printed in a rigid, tensioned state throughout all impregnating steps. The idea is to use (in the second, third, and in any subsequent impregnation) potential dyestuff solutions containing ingredients that prevent further development of the previously applied solutions. Thus solution #2, sprayed or printed over the formerly exposed composition of bath #1, must inhibit further color development of the material it covers in the second light exposure.

Example: A cotton cambric is padded with a 4% solution of a solubilized red indigosol dye (4-4′ dimethyl- 6-6′ dichlorothioindigo), stretched, fixed in position by pins, dried in the absence of actinic light rays, and afterwards exposed through the "red screen" of a three-color screen set. Thereupon the cloth is sprayed with an alkaline solution (a mixture of diazotized sulfochlorotoluene and diaceto acetic toluidine, e g, Napthol AS-G Napthosol AS-G), which acts as a yellow sensitizer and, at the same time, as a desensitizer for the red component (because of its alkaline reaction). It is then exposed under the "yellow screen." Finally, after drying as before, the cloth is sprayed with a solution of sodium chromate, sodium hydroxide, sodium thiosulfate and sodium sulfite so as to insensibilize the azo composition. Areas exposed thereafter under the "blue screen" contain the hardened chrome mordant while the unhardened, soluble-chrome-salt portions are removed by rinsing. The cloth is then dyed blue with the blue mordant dye Chromoazurine G (C I #879). A colored image, consisting of the red, yellow and blue components, is obtained in perfect registration.

Among the references cited by the Patent Office:

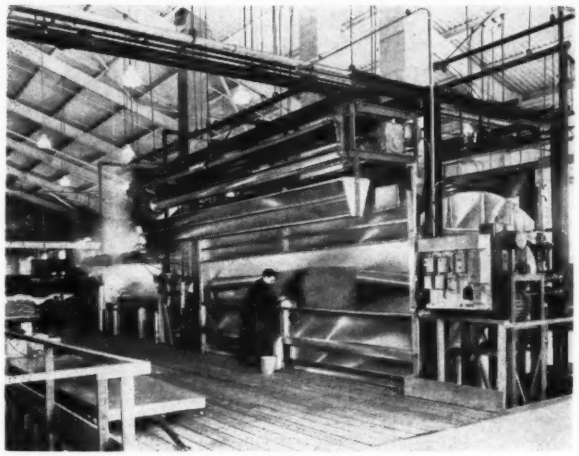
USPat 1,997,507 (Atkintievsky/1935): preparing a textile fabric with a light-sensitive antidiazo compound mixed with a coupling agent, exposing the fabric (covered with an appropriate negative), washing and drying to produce photographic-printed patterns.

USPat 1,710,455 (Langguth-Hummel/1929): a three-color photographic-printing method on paper, using azo dyes; exposing is done under different filter screens.

Reference may further be made to Brit P 640,308 (Holden), which describes a method for maintaining cloth in photographic printing processes throughout in rigid state to apply different images in registration [cf *Am Dyestuff Reptr 40,* 66 (1951)].

* This is known as the diazo-type process and is used in paper printing.

NEWS



Rodney Hunt "Tru-Shade" Dyeing Machine

• "Tru-Shade" Machine Dyeing 18′ Carpeting at Pennsylvania Plant

Magee Carpet Company, Bloomsburg, Pa, seeking a dyeing machine able to process 18-foot carpeting in open width under high temperatures, has installed a totally enclosed 20′ wide "Tru-Shade" dyeing machine, a product of Rodney Hunt Machine Company, Orange, Mass.

The new unit, which will be used by Magee to dye their new line of cotton carpets, is fabricated entirely of stainless steel and is equipped with pneumatically-operated front and back doors actuated by an air lever. The doffer reel is an M-bar type, 10″ in diameter. The folder is of the box type. Reports indicate that the machine will operate with as much as a 167-yd load, although 120 yds is normal.

Four perforated steam pipes, located both front and back beneath a false bottom are designed to induce circulation of dye liquor and maintain an even temperature in the dyebath. The manufacturer states that temperatures can be raised from room temperature to 210°F in 35 minutes with 125 psi steam. Control instruments reportedly show a front-to-back temperature variance within 2°F most of the time.

The unit's spreader, for automatic opening and centering of the carpets, consists of a conical stainless steel scroll roll that is divided into two sections, each having an electronic brake on the end.

"Tru-Shade" machines range in size from 6 to 20 feet in width.

• CSI Introduces Low-Pressure Thickness Gauge at AATCC Convention

Custom Scientific Instruments, Inc, Arlington, N J, took the occasion of the 1953 AATCC Convention to introduce to the trade a low-pressure thickness gauge, designed specifically for the determination of the thickness of soft, bulky fabrics. The equipment is of the general type approved by the British Standards Institute but modified to incorporate some minor improvements.

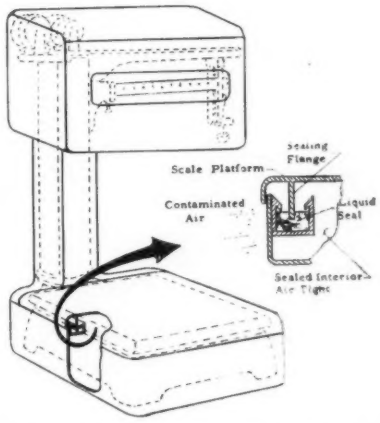
A specimen is held vertically between an anvil 1 sq cm in area and a presser foot connected to a micrometer dial graduated in mils. The anvil is part of a lever arm arranged so that both arms are of equal length. Therefore, a weight hung in the notch of the horizontal arm gives direct pressure measurements in g/cm². Weights of 5 g, one-tenth and one hundredth of a pound are supplied. The lever arm is suspended by a length of shim stock to provide a frictionless bearing. When the presser foot is moved against the fabric by means of a vernier screw, the fabric and anvil are moved to the left until the anvil contacts an adjustable zeroing screw, the contact being indicated by completion of an electrical circuit which flashes a red light. If the equipment has previously been adjusted to zero without a specimen, the specimen thickness will be indicated on the dial.

This instrument has two advantages inherent in its construction. First, the fabric is suspended vertically, eliminating compression of the fabric under its own weight. Second, the fabric itself determines the end-point of the test since both presser foot and anvil are free to move during the duration of the test. Thus, any compression of the fabric is related only to its construction and the fabric is allowed to seek an equilibrium position during test.

• Cellosize Hydroxyethyl Cellulose Available in Powder Form

Carbide and Carbon Chemicals Company, a Division of Union Carbide and Carbon Corporation, has announced the commercial availability of a powder form of Cellosize hydroxyethyl cellulose from new plant facilities at Niagara Falls, N. Y.

Useful as a thickener, stabilizer, dispersant and binder, the white, water-soluble powder is offered in two viscosity types—Cellosize WPHS (viscosity of a 5% solution approximately 7000 cps at 20°C), and Cellosize WPHS-Low (viscosity of a 5% solution approximately 100 cps at 20°C). Both are said to contain a minimum of 60% hydroxyethyl cellulose and to have a maximum salt content of 35%.



Shown above is the new industrial scale seal, which fits over standard models of weighing scales, protecting them from foreign matter and corrosion. The device was recently put on the market by Applied Engineering Company of Orangeburg, S C. (See page 522, August 3rd issue.)

• New Package-Dyeing Process Yields Improved Stitch Construction

A new process for package dyeing of filament nylon splicing yarn, which is said to give full-fashioned hosiery more uniform shrinking and as a result, improved stitch construction, has been developed by the Central Yarn and Dyeing Company, Gastonia, N C. The "more uniform shrinking" results because Central's new process leaves greater residual shrinkage in the dyed yarn.

The splicing yarns dyed by this process are expected to prove valuable for manufacturers who use the Dunn Method, and in addition, for those who use Smith-Drum or Proctor dryers. The splicing yarn is used for toes and heels of full-fashioned hosiery.

The development is expected to be of interest, also, to manufacturers using standard methods of preboarding and finish boarding, which require use of steam temperatures of 265°F. With the new splicing yarn it is expected that they will be able to operate at lower temperatures, with the same setting cycle, or at the same high temperature with a shorter setting cycle. It is also anticipated that Central's new splicing yarn will help eliminate "crow's feet" and rolling in hosiery goods, reduce "seconds" considerably and cut inspection costs.

• Production of Spun-Dyed Rayon Begun in U S

The first production of spun-dyed rayon staple in this country has been started at the new plant of Courtaulds, Inc in Mobile, Alabama. Heretofore, all of Courtaulds' spun-dyed rayon sold here has been imported from England where it was produced by the parent company, which originated the product before the last war.

In Courtaulds' British plant fourteen colors are now in production, with four to be introduced shortly. In Alabama, the initial production program of spun-dyed rayon staple is set at ten colors.

Plans are advanced to enable Courtaulds to produce in Mobile small quantities of colored staple and tow to match customers' special shades which are not in the standard color range. The combined English and American production will enable Courtaulds, Inc to offer a wide range of shades, staple lengths and deniers.

In Alabama, Courtaulds' spun-dyed rayon will be produced in 1½ denier, 1-9/16 inches and 3 denier, 2 inches for the cotton, American and woolen systems. For the present, other deniers and lengths will continue to be imported from England.

The Feon lab coat, a product of the Filtration Fabrics Division, Filtration Engineers, Inc, Newark 4, N J, is said to be outlasting others many times while retaining virtual immunity to industrial chemicals, bacteria and mildew. Made of light weight, admiralty gray Vinyon-N fabric, the coat reportedly keeps a neat, tailored appearance through hard wear and laundering while remaining comfortable to the wearer.

• Geigy Introduces New Cuprophenyls; Whitening Agent

Cuprophenyl Rubine RL and Cuprophenyl Brown GL, new additions to their Cuprophenyl range of dyestuffs, and Tinopal GBT, a whitening agent for use by cotton and rayon plants using chlorine as a bleach, have been introduced to the trade by Geigy Co, Inc, New York.

Cuprophenyl Rubine RL is designed to give bright, bluish-red shades with good fastness to light and washing on cotton and viscose rayon. It is expected to find application in shading in addition to its use as a base for wine shades. Geigy points out that Cuprophenyl Rubine RL possesses very good resistance to sunlight; much higher washfastness than direct dyestuffs; excellent fastness to perspiration, water and hot wet pressing; and good lightfastness after creaseproof finishing. It is also said to be level dyeing and not salt sensitive. Aftertreatment with G-67, following dyeing or in creaseproofing, is said to produce still higher washfastness.—Bulletin 51-G

Cuprophenyl Brown GL is said to produce pleasing shades of brown on cottons and rayons when aftertreated in the usual manner. It is claimed to have outstanding fastness to severe washings, high resistance to light and suitability for creaseproofing. Geigy suggests the use of Cuprophenyl Brown GL where diazotized and developed browns are employed because of superior fastness and over-all economy. Combinations of the new dyestuff and Irgalan Browns are said to give excellent unions of outstanding fastness on blended fabrics of viscose rayon and wool. Cupraphenyl Brown GL is also adaptable to aftertreatment with G-67.—Bulletin 52-G

Bulletins on both new dyes are available from Geigy Co, Inc, 89-91 Barclay St, New York 8, N Y.

Tinopal GBT is said to possess very good resistance to chlorine, hypochlorites and peroxide bleaching, producing a white fluorescence with a noticeable blue cast. When applied at 100° F *without salt* and raised to 140°F in 30 minutes, Tinopal GBT reportedly draws slowly and exhausts almost completely. Unlike with other Tinopals, salt should not be added at the start of the application procedure, but may be added after 30 minutes for full exhaustion.

• Complete Washability for Direct Dyed Rayons

A finishing process designed to render direct-dyed viscose rayon fabrics completely washable, announced jointly last Spring by the Sandoz Chemical Works, New York, and Aquex Development & Sales Corp, Whippany, N J, appears to be proving itself in actual production.

Key components in the process are Aquex BNW, a chelated vinyl acetate copolymer complex finishing resin, and Cuprofix, Sandoz's complex copper-resin dye-fixing agent.

Besides complete washability, the process is said to offer the following features and characteristics:

1) excellent dimensional stability, with low residual shrinkage and no progressive shrinkage on repeated launderings;

2) excellent color fastness (as tested by A A T C C Wash Test No 3)—no color bleeding in home washing machines or in commercial laundries; excellent fastness to light, using direct dyes instead of vats;

3) excellent retention of physical properties, tensile strength and flex abrasion resistance;

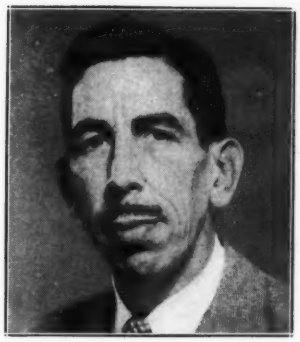
4) ease of production—use of standard finishing equipment and excellent bath life;

5) production of heavy and medium shades without the expense of vat dyeing.

R C Gralow

R C GRALOW has been appointed director of product development for Corn Products Refining Company, New York, N Y. He joined the firm in 1943 at their Argo, Illinois plant and was subsequently transferred to the New York Office in 1948 as sales manager of the Chemical Division.

Succeeding Mr Gralow as Chemical Division sales manager is C J McDOWELL, formerly senior fellow of the Corn Products Fellowship, Mellon Institute.



C J McDowell

SYMPOSIUM ON CONTINUOUS ANALYSIS OF INDUSTRIAL WATER AND INDUSTRIAL WASTE WATER

American Society for Testing Materials
1916 Race Street, Philadelphia 3, Pa
$1.50 per copy; 64 pages; heavy paper cover

Industry, having recognized water as an essential engineering material, is frequently called upon to evaluate its properties, both from the standpoint of its use and its disposal. Precise analytical determinations are necessary if equipment is to function properly, and the frequency of sampling and analysis has become great. Continuous analysis has therefore become essential, and with the present-day increase in labor costs, emphasis is being placed on the use of automatic equipment. It is with this need in mind that ASTM Committee D-19 on Industrial Water developed this Symposium.

The titles and authors of the papers are as follows:

"Introduction"—B W Dickerson, Hercules Experimental Station, Hercules Powder Co, Wilmington, Del.

"Automatic Sampling of Industrial Water and Industrial Waste Water"—M F Madarasz, Plant Engineering Office, Ford Motor Co, Dearborn, Mich.

"Some Practical Aspects of the Measurement of pH, Electrical Conductivity, and Oxidation-Reduction Potential of Industrial Water"—R Rosenthal, chief chemist, Industrial Instruments, Inc, Cedar Grove, N J.

"Continuous Recording of Chlorine Residuals and Determination of Chlorine Demand"—A E Griffin, dir, technical serv, Wallace & Tiernan Co, Inc, Newark, N J.

"Measurement of Color, Turbidity, Hardness, and Silica in Industrial Waters"—F C Staats, Hercules Experiment Station, Hercules Powder Co, Wilmington, Del.

"Continuous Measurement of Dissolved Gases in Water"—J K Rummel, senior engineer, Sheppard T Powell, consulting chemical engineer, Baltimore, Md.

TECHNICAL LITERATURE

(Unless otherwise noted, the following trade literature may be obtained free of charge by writing on business letterhead to the address indicated.)

ACRYLONTRILE

American Cyanamid Company
30 Rockefeller Plaza
New York 20, N Y

Dr A J Weith reviews the historical aspects, present and new production methods, plants and producers, past and future production volume, price history, end uses and new uses for the chemical.

ALDEHYDES

Carbide and Carbon Chemicals Company
30 East 42nd Street
New York 17, N Y
36 pages

F-5278 discusses in detail the fourteen members of this family of highly reactive chemicals now sold in commercial quantities by the Company. Information on other aldehydes that are available in research quantities is also included.

The book has been prepared as a handy reference for people in the chemical industry: chemists, engineers, purchasing agents, and production and laboratory workers. Uses and suggested applications for the aldehydes, their physical properties, shipping data, specifications, test methods, constant-boiling mixtures, and a list of selected references to aldehydes in the technical literature are included.

ANTARA CATALOGUE

Harold G Shelton, sales manager
Antara Chemicals Division
General Dyestuff Corporation
435 Hudson Street, New York 14, N Y
28 pages

The catalogue covers such product groups as detergents, wetting agents, emulsifiers, brighteners, sequestrants and dyeing assistants, listing application suggestion in a wide range of industries.

A new and simplified nomenclature system for Antara's entire line of products is introduced.

METALSMITHS STAINLESS STEEL AND MONEL UTENSILS

Metalsmiths Division
Orange Roller Bearing Co, Inc
560 White St, Orange, N J
4 pages

Information on Metalsmiths' complete line, including pails, dippers, funnels, scoops, measures, starch buckets, batch cans, dippers, beakers and shovels. Latest prices are shown, together with information on special items and fabricating devices.

PERFUME SPECIALTIES FOR INDUSTRIAL APPLICATIONS

Polak & Schwarz, Inc
667 Washington Street
New York 14, N Y

This booklet lists a number of outstanding mask odors, neutralizers, odorants, and industrial perfume oils suitable for various products. Recommendations for their use, as well as solubility and other technical data, are included. Suggestions are given for many new applications for industrial perfumes.

BECKMAN PORTABLE pH METERS

Bulletin 322-153
Beckman Instruments, Inc
South Pasadena 1, Calif
4 pages

Salient performance features and pictures distinguish the four pH meters in the series. They include an instrument for laboratory and research studies; a line-operated model for routine measurements in the control laboratory, and two lightweight portables for plant and field applications. The booklet also lists typical industries where these instruments are used.

VAN . . . STAINLESS METAL FABRICATORS

Associated Advertising Agency Inc,
First National Bank Building, Cincinnati 2, Ohio

An 8-page issue of The John Van Range Company, Cincinnati, O. After sketching the company's century of experience, the book gives examples in picture form of equipment custom-made by Van and defines the area of Van's stainless fabrication.

POSSIBILITIES WITH FATTY ALCOHOLS

M Michel and Company, Inc
90 Broad Street
New York 4, N Y

The use of Cachalot brand cetyl, oleyl, and stearyl alcohols in various applications, including textile chemical specialties, is discussed.

CATALOG SECTIONS S-7530 and S-6820

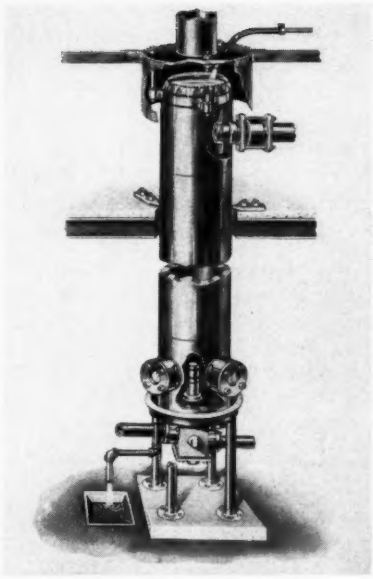
National Carbon Company
A Division of Union Carbide and Carbon Corp
30 East 42nd St, New York 17, N Y

Catalog Section S-7530 covers "National" Graphite combusion chambers with "Karbate" Brand impervious graphite burner nozzles.

This complete processing unit is fully illustrated and described, with detailed suggestions and recommendations for its use in the burning of wet hydrogen and chlorine gases from diaphragm cells; in the burning of "sniff gas" with wet or dry hydrogen; or in the burning of re-evaporated chlorine, dried but not compressed chlorine, or cooled but not dried chlorine from mercury cells with wet or dry hydrogen.

Dimensioned engineering drawings show the construction of the combustion chambers and burner nozzles. Tables of dimensional sizes and capacities aid in specifying, ordering, installing and operating the equipment.

Principal features of the unit, as outlined in the Catalog, are: immunity to uncooled cell gases saturated with water, long life without corrosion and with a minimum of maintenance, ability to withstand thermal shock, a design that is



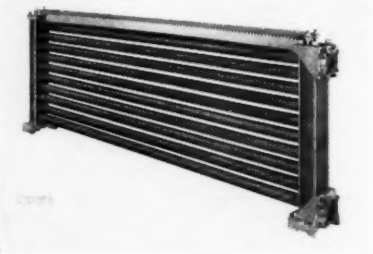
"Karbate" Impervious Graphite Burner Nozzle

said to permit the construction of acid systems having no moving parts, and moderate cost.

Catalog Section S-6820 covers the "Karbate" Brand impervious graphite sectional cascade coolers, Series "CC."

The new design of the Coolers is fully described and their applications outlined. The three standard sizes are illustrated by dimensioned engineering drawings, and the features, common to all sizes, are explained: Type SN armored connections; radiused cross-overs between sections for high fluid velocities with minimum pressure drop; high cooling-water capacity; redwood water guide strips with stainless steel clip springs; heavy base plate castings; and "Teflon" gaskets.

The Catalog Section also contains information to aid in the selection of "Karbate" impervious graphite sectional cascade coolers for the cooling of corrosive liquids and gases, complete tables of dimensions and specifications, as well as nomographs for determining cooling water requirements, overall heat transfer coefficients, and required cooling surface.



"Karbate" Impervious Graphite Sectional Cascade Cooler

UDET, UDEX AND UDESOLVE DETERGENTS AND SOLVENTS

Bulletin #55
Universal Detergents, Inc
1825 East Spring Street
Long Beach 6, Calif
4 pages

Various properties and applications of these products are described.

The two basically different alkyl aryl sulfonate detergents, Udet and Udex, are said to offer extreme flexibility in formulating as both are high in active content and are made in liquid and powder form.

Udesolve is a line of four different aromatic hydrocarbon solvents with wide industrial applications.

ARTICLE REPRINT REQUEST SHEET

Richard Minard
Technical Service Dept
Brookfield Engineering Labs, Inc
Stoughton, Mass

The Brookfield Engineering Laboratories, manufacturers of the Brookfield Synchro-Lectric Viscometer, have reprinted a variety of articles and other papers bearing upon viscosity and related subjects. These technical papers have been described and classified in the "Article Reprint Request Sheet" so that readers may note which papers may be of assistance to them and request those desired by their item number.

ETHYLENE AMINES

Carbide and Carbon Chemicals Company
30 East 42nd Street
New York 17, N Y

F-8163 gives physical, chemical and physiological properties; specifications and shipping data; and application data on the ethylene amines—ethylene diamine, diethylene triamine, triethylene tetramine, and tetraethylene pentamine. Ethylene amines are used in the synthesis of corrosion inhibitors, resins, wetting agents, water softeners, fungicides, etc.

HEAT LINES BY JENSEN

Jensen Specialties, Inc
9331 Freeland Avenue
Detroit 28, Michigan
4 pages

This new bi-monthly publication of technical data and tips on process heating is designed to help those engaged in production planning and maintenance.

Typical installations at various U S manufacturing plants are featured in each issue. Special heating problems of these manufacturers and how they were solved are described and illustrated.

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